AMERICAN GAS JOURNAL

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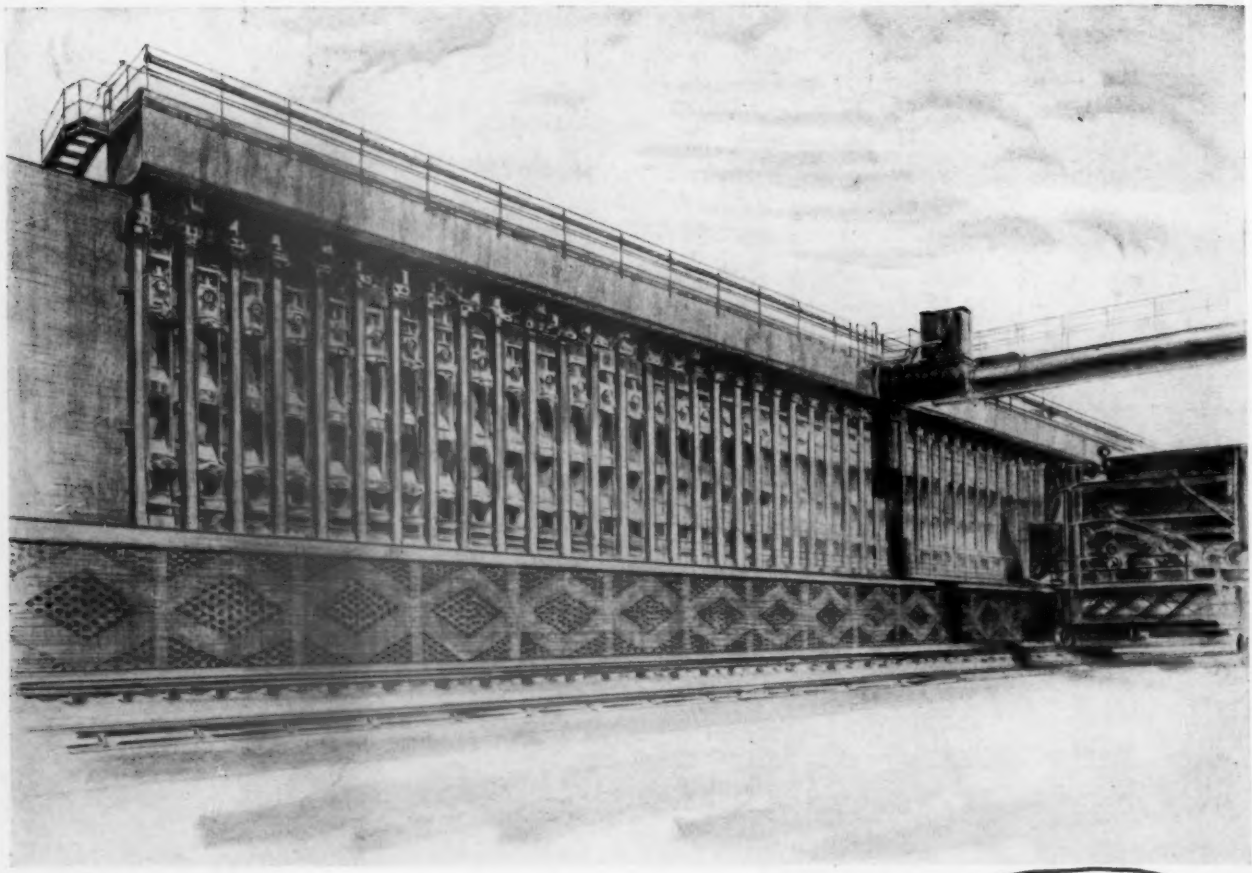

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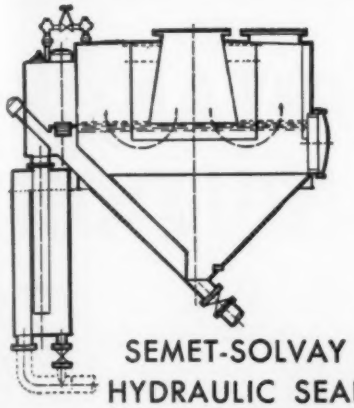

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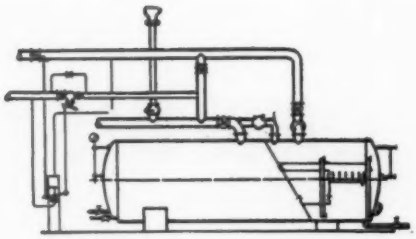

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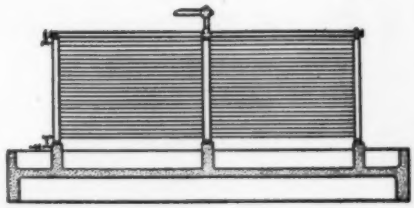

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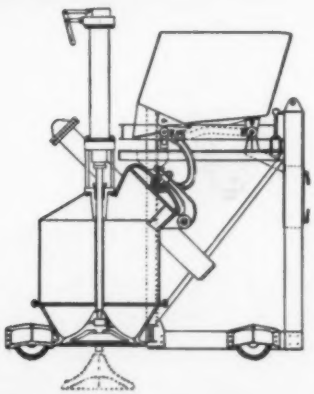

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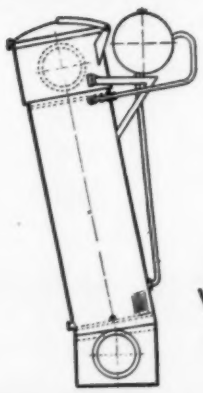

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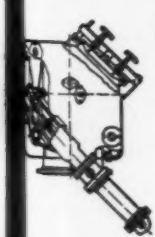

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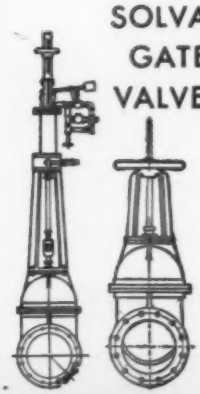

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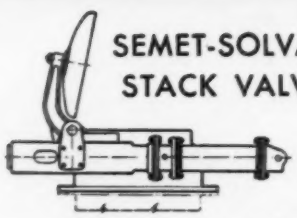

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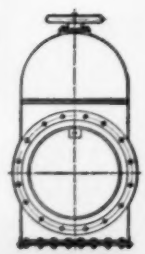

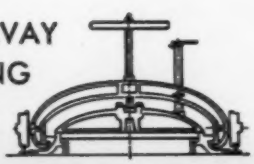

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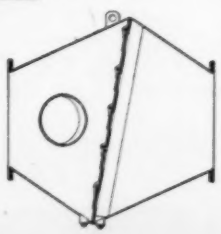

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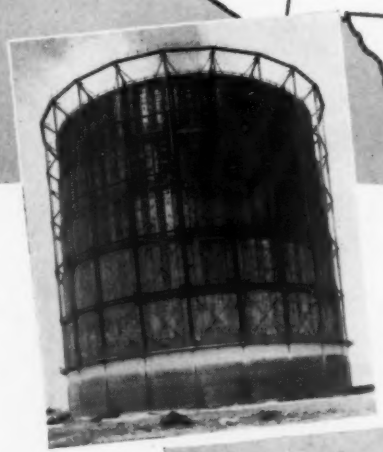

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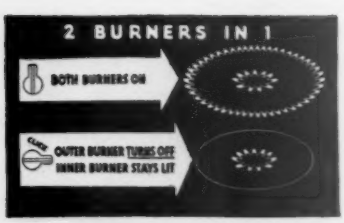

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VOLUME 166
Number 6

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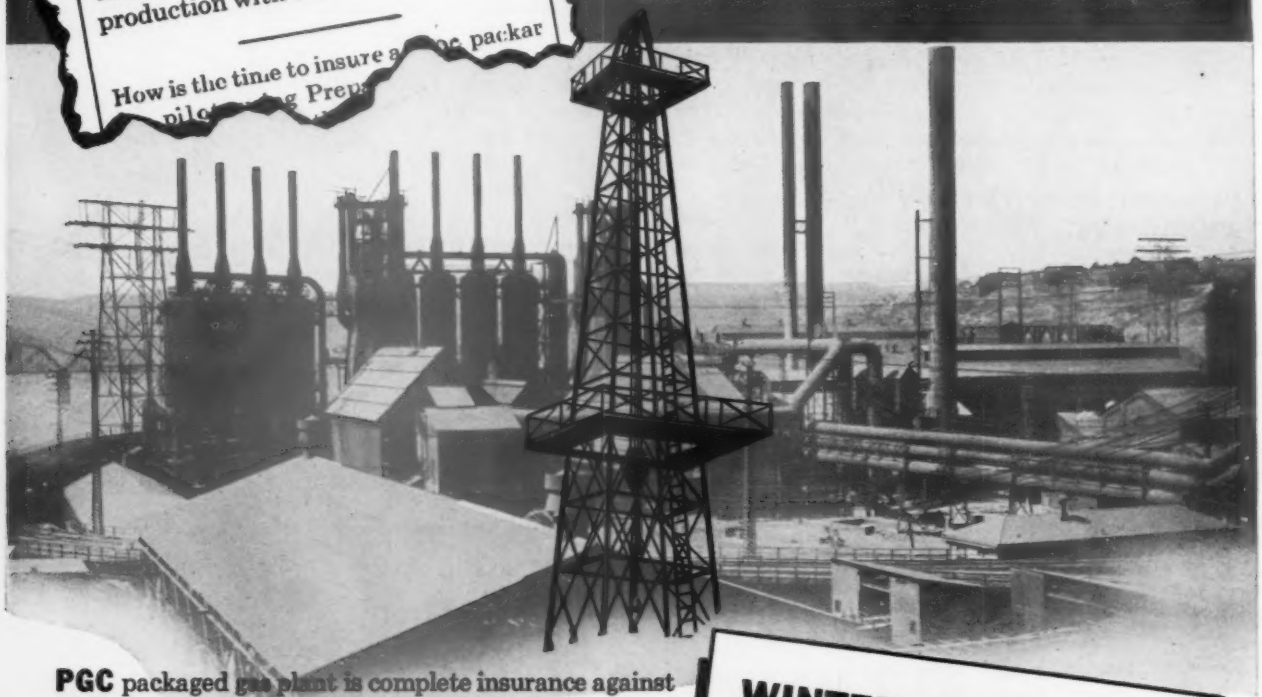

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JUNE 1947

AMERICAN GAS JOURNAL

VOLUME 166 No. 6

Experience With A Gas Plant Conversion

By **Virgil Stark,**

President of Claremont Gas Company and North American Utility & Construction Corporation

THE Claremont Gas Light Company, chartered in 1860, has a perpetual franchise for gas distribution in Claremont, N. H. (14,000 population). The control of this company (100,000 dollar shares) was taken over in December 1944 by the North American Utility & Construction Corporation. The carburated water gas distributed by the company was completely converted to propane gas in March, 1946 and was not done before because of the scarcity of materials during the war. The engineering and contracting of the conversion to propane gas was done by North American Utility & Construction Corporation which had installed 20 central propane distribution systems with 20,000 appliances for the Government Housing Projects.

It is interesting to compare three periods of operation of the Claremont gas plant which might be typical for other towns in this country. This comparison indicates that their small gas property survival lies in the conversion to LP gas. It also shows what a better management can do to improve existing conditions with manufactured gas.

The first period taken, 1944, is previous to the management change and is similar to the operation results of a number of years before that change. It reflected a loss ($11,704.50) from the operation with carburated water gas.

The second period, for the calendar year 1945, and for operation with the old carburated water gas plant, but with improvement made by a more aggressive management eliminated the loss and broke about even with a small margin of profit ($725.41).

The third period of one year after conversion to propane gas from March 1, 1946 shows a comparable profit of $9,738.50.

All periods show the profit after depreciation (average $7,500.00) and local taxes but no salaries for officers.

In the second period, the production cost of the carburated water gas was reduced by revising the gas making operation and reducing fuel and labor costs. Coal was partially used ($8.5 per ton) instead of coke ($11 per ton) and the consumption was reduced from 34.48 to 28.45 lbs. per MCF. The gas oil consumption was reduced from 3.37 to 2.77 gallons per MCF. The air blower operation was revised and the steam turbine changed to an electrical motor. The steam production was also revised. The production labor expenses were reduced from 31.7 cents per MCF to 16.4 cents per MCF.

The number of consumers was increased, more appliances were sold and the general expenses were reduced. In this way, primarily because of a more aggressive management, the business broke even.

Gas Production

The important change came, however, in the third period after the propane gas equipment was installed.

Table I shows the comparison of the three periods. The production cost of gas was reduced by 54.2% compared with the first period, and 34.2% as compared with the second period. The average cost of the propane at the plant was about 9 cents/gallon or 9.85/therms. The differ-

TABLE I—GAS PRODUCTION

	CARBURATED WATER GAS		PROPANE GAS
Period	Previous Management First Period	New Management Second Period	Third Period
Year	1944	1945	1/3/1946-1/3/1947
Production Mcf of 525 Btu	31,227	33,638	42,500
Production Thousand therms	16,400	17,400	22,400
Increase from period I	——	8.5%	36.5%
Increase from period II	——	——	28.6%
Cost of production $	$35,153.60	$26,055.17	$25,865.46
Production cost per mcf of 525 Btu, $	1.12	.775	.605
Production cost per therm $	.214	.149	.115
Reduction of production Cost compared with Period I and period II	—— ——	30.5% ——	54.2% 34.2%

ence to 11.5 cents/therm consists in labor, maintenance and heating of the old gas holder. The cost of propane in this country depends on the location of utilization, as the freight represents generally a large part of the cost price. Propane costs in Claremont as much as twice the price in the Middle West or California. Therefore for gas plants in such areas the production cost of the propane air gas could be as low as 6 cents per therm or 31.5 cents per MCF of 525 Btu and should be figured out by each gas plant wishing to convert to propane air.

The holder of 200 MCF was maintained in operation. It represents an important standby, reduced hours of operation of the propane gas mixing equipment and a perfect equalization of the heat content of the gas. Previously the variation of heat content of the gas was important (from 490-540 Btu per cf). The heat content is now practically constant with 900 Btu per cf and is checked by a Cutler-Hammer thermeter.

The heating of the holder was revised. Only one lift was used in winter so as to reduce the quantity of water to be heated. Instead of using the large existing boilers, a simple installation was operated consisting of a pump for permanent circulation of the water having as automatic standby the city water. A 5 hp gas boiler with automatic shut-off device and thermostatic control was used to heat the water.

The cost of heating the holder was approximately $350.00 for the winter season which represents about one third of the previous cost. The new equipment (about $800.00) will therefore be amortized in one year.

Gas Consumption and Revenue

The rate was changed from cubic feet to therms. Instead of increasing the rates following the new investment in propane equipment, the company lowered the rates introducing a new degressive rate with important reduction for the larger consumer so as to encourage more gas consumption. This reduction was made possible because of the reduction in production cost of the gas.

Table II shows the result of this policy in the first year of operation. As compared with the first period, the rate was reduced an average of 14%. The gas consumption, however, increased by 39% and the revenue from gas increased by 17.5%.

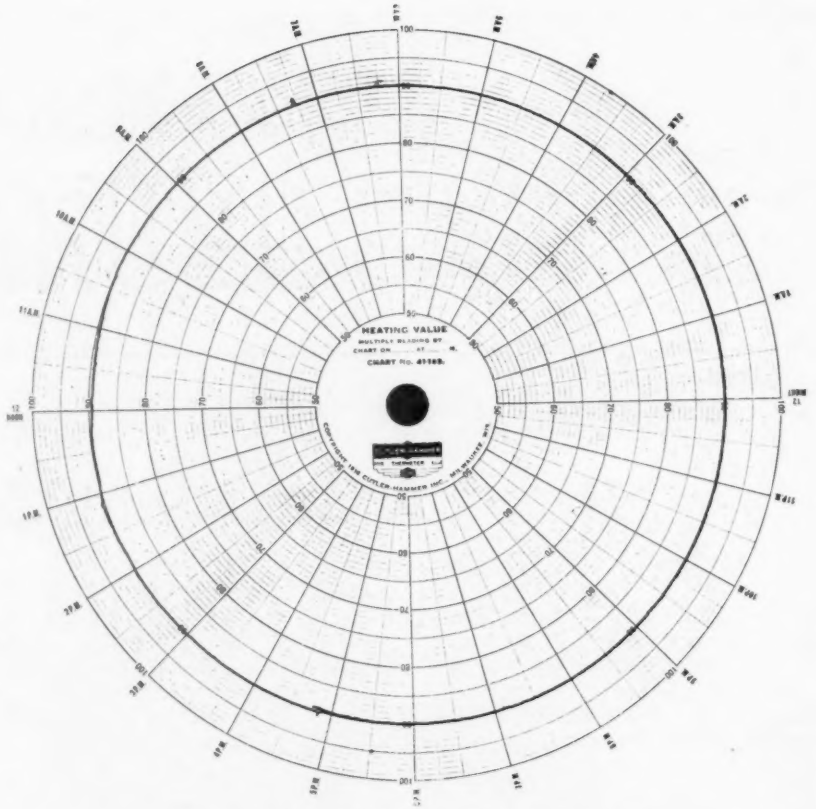


Chart shows stability of heat content of propane air.

TABLE II—GAS CONSUMPTION & REVENUE

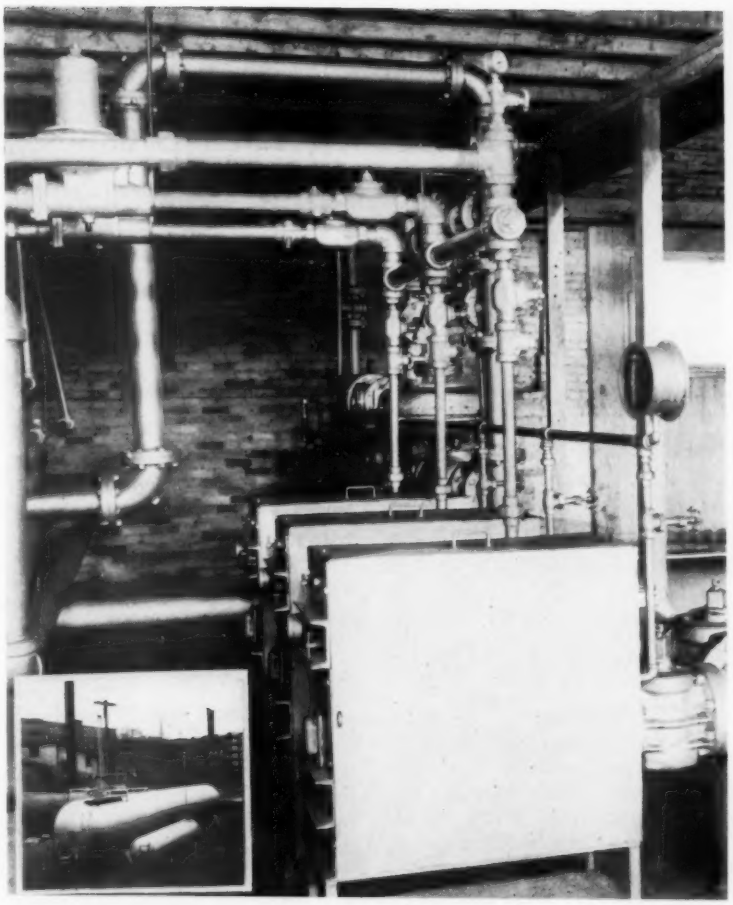
	CARBURATED WATER GAS		PROPANE AIR	DIFFERENCE BETWEEN Period 3 and 1	
	Previous Management	New Management		Plus	Minus
Period	First	Second	Third		
Year	1944	1945		1/3/46-1/3/47	
Number of Consumers	1238	1359	1406	14%	
Residential					
Sales Mcf 525 Btu	18,160	18,481	21,640	19.4%	
Revenue $	41,951	41,581	44,169	5.4%	
Average Rate $/Mcf	2.3	2.27	2.04		10%
Commercial					
Sales Mcf 525 Btu	2,801	3,514	5,930	110%	
Revenue	5,170	6,490	9,211	80%	
Average $/Mcf	1.84	1.83	1.56		15.2%
Industrial					
Sales Mcf	842	698	1,110	32%	
Revenue $	1,525	1,240	1,560	2.6%	
Average Rate $/Mcf	1.81	1.78	1.41		22%
Houst Heating					
Sales Mcf	1,293	1,384	2,560	98%	
Revenues	1,190	1,252	2,063	81%	
Rate	.92	.905	.80		8.7%
Total					
Sales Mcf 525 Btu/cf	23,206	24,177	32,300	39%	
Revenue $	51,184.03	52,733.54	60,029.60	17.5%	
Average Rate $/Mcf	2.2	2.19	1.88		14%

Distribution and Unaccounted For

The capacity of the distribution system is in inverse proportion to the square root of the gravity. The gravity of the propane mixture for 900 Btu per cf is 1.19 and the gravity of carburated water gas being per .65. The square root of the proportion is 0.737 which means a reduction of 26.3% in volume distributed for the same pressure. As the heat content of the gas per cubic foot was increased 72% (900 per 525) the result is that the capacity of the system has been finally increased in thermic value by 27%. This increase of capacity is important considering the increase of consumption by 39% in the first year alone. The pressure was slightly increased from 4½ to 5" of water column.

The possible increase in leakage is a concern of some gas companies considering the conversion of their system. The leakage through an orifice is inversely proportionate to the square root of gravity. Other factors are however to be considered in the unaccounted for as pressure, repairs, meter accuracy, etc. We have seen that the square root of the proportion of gravity has been increased 26.3%. Therefore the leakage should decrease 26.3%. The percentage of 73.7% applied on the unaccounted for on the previous period figures of 8,297 MCF indicates as unaccounted for in the third period 6,114 MCF. The unaccounted for was 5,767 mcf in the third period which is very near the figured one of 6,114 MCF and confirms the calculation that the leakages in volume are reduced practically by the square root of the gravities. Each cubic foot of gas lost has, however, 900 Btu instead of 525, therefore the amount of therms lost increased accordingly. However, as the production increased also, the percentage of the unaccounted for compared with gas produced was reduced by 6.5% as compared with the previous period.

A large proportion of the 12 mile distribution system consists of cast iron pipes with bell and spigot joints. No difficulty was encountered with the pipe system nor with the meters.



Gas-Air Mixer Installation. Insert lower left shows Storage Tanks

The Capital Investment

The new propane system has 30,000 gallon storage and mixture equipment with a capacity of 30,000 cf per hour of 900 Btu per cf. The capacity is about twice the one of the old carburated gas plant. Its cost was about $34,000.

The new gas has met the satisfaction of the consumers which has accounted for an important increase in the appliances sold, and this regardless of keener competition from electricity.

The available propane storage has given the possibility of developing a bottle gas business. An affiliated company, Utilgas Corporation, supplies gas in bottles or in bulk using a 1200 gallon transport to consumers beyond the mains.

The conversion to propane gas and the new rate in therms was done with the approval and with the full cooperation of the Public Service Commission of N. H. This commission showed a progressive understanding specially as such a changeover was done for the first time in N. H. It proved to be a complete success.

In reviewing the results of this conversion it appears that the production cost of the gas has been cut 54% (34% compared with the improved gas plant) which allowed an average reduction of rates of 14%. This resulted in an increase of 39% in consumption and 17% increase in revenue. The capacity of the distribution system was increased 27% and the percentage of unaccounted for reduced with 6.5%. The capacity of the plant was doubled. Our experience should be helpful to other gas properties which have to overcome similar situations.

Employee Suggestion Program

Field Service Men In Southern California Offer Ideas for Committee Review

By
Fred A. Herr

A REPORT on a program of employee suggestion and field observation prepared by W. E. Otis, staff assistant of the customer service department of Southern California Gas Co., Los Angeles, indicates that that utility apparently has gone considerably beyond the activities of most gas companies in achieving the benefits from a suggestion program which is used as a means of securing information from the men on the job regarding servicing problems.

Mr. Otis pointed out in his report that for several years the Southern California Gas Company has fostered a program which provides for the uniform handling of all voluntary reports that the service group might desire to submit regarding company operations and gas appliances.

The reports, according to Mr. Otis, are forwarded to a central processing point from about 24 operating bases and are then segregated into two general classifications — suggestions and field operations.

"Suggestions" are defined in the plan as ideas with a reasonable degree of originality submitted for acceptance by the company and intended for improvement of operations. They include tools and materials, etc.; servicing policy and methods; Helpful Henry service hints; and safety suggestions.

"Field operations," Mr. Otis explained in his report, "may be considered, in one sense, as suggestions as they all carry the implied suggestion of the servicemen that 'someone should get off the dime and have some changes made.' However, since they report the problem encountered and only suggest that someone else effect the cure, they are classified as field observations. These reports are segregated into the following groups":

1. **Dealer Installations and Complaints**
   a) **Unsatisfactory appliance installations, leaks, etc.**
   b) **Appliances left in poor adjustment by installers.**
   c) **Unsatisfactory customer-dealer relations.**
2. **Appliance Operation and Design**
   a) **Appliance defects due to design or assembly.**
   b) **Accessory defects due to design or assembly.**
   c) **Appliance servicing problems.**
   d) **Requests for servicing information.**
3. **Other Observations**
   a) **Questionable articles appearing in publications.**
   b) **Standard practices or company operations.**
   c) **Miscellaneous reports, complaints, etc.**

Report Forms Provided

Mr. Otis reported that employee suggestions and field observation forms are used by the Southern California Gas Company which are made available to employees in the stationary bin on each service truck. This he explained, makes it possible for a new idea or field problem to be written up immediately after it occurs to a serviceman and is still fresh in his mind.

"Suggestions are impartially investigated through the Standards Section," Mr. Otis reported, "or the Customer Service department, and are forwarded, with the findings, to the operating manager's staff for recommendation. New or improved tools, materials and methods are involved in the bulk of the suggestions. For example, in one case the acceptance of a field-developed method of repairing range oven standby pilots on the first service call is estimated to yield a yearly savings of approximately $1000 over the method previously used. The story of the development of this suggestion follows a pattern typical of many suggestions which have been placed in effect by the company.

"Servicemen are provided with a short length of ¼" hose to blow lint from otherwise inaccessible places, particularly on space heaters. Because the end of the tubing melted from the heat a ¼"x4" copper tube extension was also used. One serviceman found that by installing this extension over a burned-off oven standby pilot stub, the pilot could be restored to its original length without a replacement pilot being ordered through the parts repair section. His findings were submitted as an employee suggestion and its acceptance resulted in a bulletin being distributed stating that this particular serviceman had developed the new use for a currently supplied piece of material. The job is now completed in no longer time than it previously took to issue the parts order and a call back to the customer's premises has been eliminated."

Mr. Otis also explained that servicing shortcuts which originate from a desire of the service group to share their trade secrets are also included in the suggestion classification. These field-developed methods which are submitted by servicemen, are distributed to all operating bases through the medium of so-called "Helpful Henry Sez" bulletins after a brief review for safety and reasonable practicability.

In outlining the field observations phase of the program, Mr. Otis declared that it is to the advantage of the company to encourage dealers of new appliances to carry their sales transactions through to the point of leaving the appliance satisfactorily installed on the customer's premises and properly adjusted.

Requests for Service

"The increasing number of new appliance dealers, plus the shortage of experienced installers," Mr. Otis reported, "has been responsible for a rather large number of customers' requests for service. In order to get the customer out of the muddle, the necessary adjustments are made by the servicemen. However, in order to attempt to correct the trouble at its source, installation training is offered through the dealer training section. The serviceman, when called to adjust a new appliance, sees at first hand the keen disappointment expressed by the housewife when the new addition to her home has not performed in accordance with her expectations.

"The serviceman's desire to assist in assuring the best possible customer

satisfaction with gas appliances can best be measured by the fact that of all voluntary reports received during 1946, 49 per cent reported dealers who had left new appliances installed in an unsatisfactory operating condition."

Mr. Otis added that field observations of this type have provided the dealer training section of Southern California Gas Co. with the names of many concerns selling gas appliances who are in need of assistance in training their installers in proper installation and adjustment procedure.

Character of Reports

Mr. Otis' report stated that 37 per cent of the total of reports received from servicemen have been observations regarding items of questionable nature encountered on appliances of post-war manufacture. The company's plan calls for field observations regarding operation or design of new appliances to be referred to the appliance servicing committee. This committee, guided by a utilization engineer, consists of a district foreman, several staff representatives from the customer service department, and a member of the utilization engineering staff of the gas company.

"The items submitted to this committee are reviewed and, when necessary, additional information is collected through field checks, or the problem recommended for review by the gas appliance laboratory of the Southern California and Southern Counties Gas Companies. Where the matter is primarily one of servicing or of an assembly error, the manufacturer may be contacted directly through the appliance servicing committee. Where the gas appliance laboratory is involved, the formal procedure for contacting the manufacturer regarding the findings and field reports is followed."

Mr. Otis reported that some of the field observations referred to the committee uncover complicated servicing problems due to the new and frequently more complex controls now being marketed. In this case, he declared, the manufacturer is contacted, the proper servicing methods determined, and the information disseminated through the medium of the employee training section.

Since December 1, 1945, the Southern California Gas Company's employee suggestion and field observation program has operated under the following procedure.

1—All voluntary reports which the servicemen may desire to submit should be reduced to writing on the form entitled "Employee Suggestions or Field Observations" and turned into the employee's immediate supervisor.

2—The supervisor will review the report and add his comments in the space provided and forward same to the suggestion and observation coordinator.

3—Field observations, other than dealer complaints, will be promptly acknowledged by a letter advising the observer to whom the matter has been referred for action.

(a) These observations will be referred to the appliance servicing committee or appropriate sections for review and investigation.

(b) Reports back to the coordinator will be requested in order that the observers can be advised of the investigations made.

4—Field observations involving dealer complaints will be acknowledged by districts once each month at which time reports of investigation made during the previous month will be forwarded to the districts involved.

(a) Dealer complaints will be forwarded to the dealer training section for investigation.

(b) After investigation is completed, the dealer training section will return the observation with completed report in order that it may be forwarded to the observer.

5—Suggestions will be promptly acknowledged and the suggester advised of the probable length of time necessary to secure an investigation and obtain a decision.

(a) Investigation will be either arranged for or made by the standards section.

(b) All data obtained from investigation will be presented to the operating manager's staff for final recommendation.

(c) A final report will be forwarded to the suggester.

(d) Accepted suggestions will be followed up by standards section to make sure they are placed in effect and that credit is given to the man turning in the suggestion through use of his name in transmittal letters or Employee Suggestion and Field Observation bulletins.

Policy of the company does not *require* servicemen to participate in the program. No monetary awards are offered, but participation is encouraged by publicizing the success of the program and assigning credit to the service group for the results obtained.

Increase in Reports

Mr. Otis reported that during the first month after the present procedure was inaugurated, 11 field observations were submitted. By December, 1946, one year later, 187 employee suggestions and field observations were received in one month. During the 13 month period from December 1, 1945 to December 31, 1946, 87 suggestions and 999 field observations were submitted by an average of 273 field personnel who were eligible for participation.

In the summary of his report Mr. Otis stated: "The large increase in employee suggestions and field observations during the past year is due, we believe, mainly to the fact that the service group has been supplied the proof that their suggestions and field observations are individually investigated and that results are obtained in a large percentage of the cases reported. However, it also can be assumed that the promotional activities of circulating the submitter's name whenever possible and publicizing the program in general have given added impetus to the service group's desire to participate in this program which we believe will encourage a better cooperation between all groups associated with the gas industry, and thereby assure continued customer satisfaction with gas as a fuel."

Gas Refrigeration Portfolio Issued by Servel Inc.

A new refrigeration portfolio for 1947 has been released to the gas industry which shows the complete advertising and sales promotion program of Servel on the new gas refrigerator.

In making the announcement of this new promotional program, R. J. Canniff, Advertising and Sales Promotion Manager pointed out two special features of the portfolio. The first is a "Memo to Management" which is a quick-reading digest of important facts about the refrigeration load. The second are six descriptive file folders which contain all available advertising materials put out by Servel.

These advertising folders include local advertising materials, direct mailing literature, retail salesmen's aids, home service materials, displays and signs and salesmen selection and training.

In releasing the portfolio Mr. Canniff said, "7,000,000 families are in the market for refrigerators." Now, however, is the time for organization, planning and management for greater sales effort in the approaching buyer's market.

MORE THAN 20,000,000

. . . and this is just one of the hard-working ads in Gas Refrigeration's greatest advertising campaign in history

During the months when refrigerator buying reaches its peak, full-color ads like the one shown here will appear in eleven of America's best-read home magazines. Again and again, Gas Refrigeration's exclusive selling story of silent operation, no moving parts, and longer wear will be told to the families that make up the backbone of the buying public. And these ads will have a high repeat readership—from both men and women—because the publications selected remain on the family's magazine table for a long time.

Now's your big chance to cash in on the success of Gas Refrigeration's national campaign with local promotion of your own! Large reprints of these ads are yours for the asking. Make them work for you. Let them help you tell refrigerator prospects in your community that *you* sell the Servel Gas Refrigerator—the refrigerator that stays silent, lasts longer.

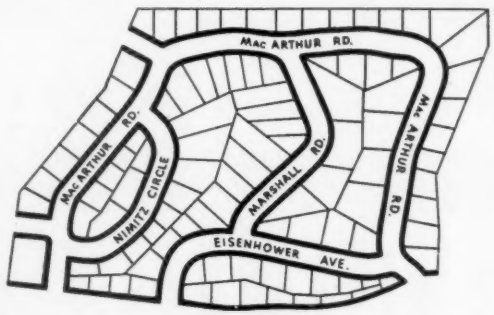
Servel GAS REFRIGERATOR

EVANSVILLE 20, INDIANA

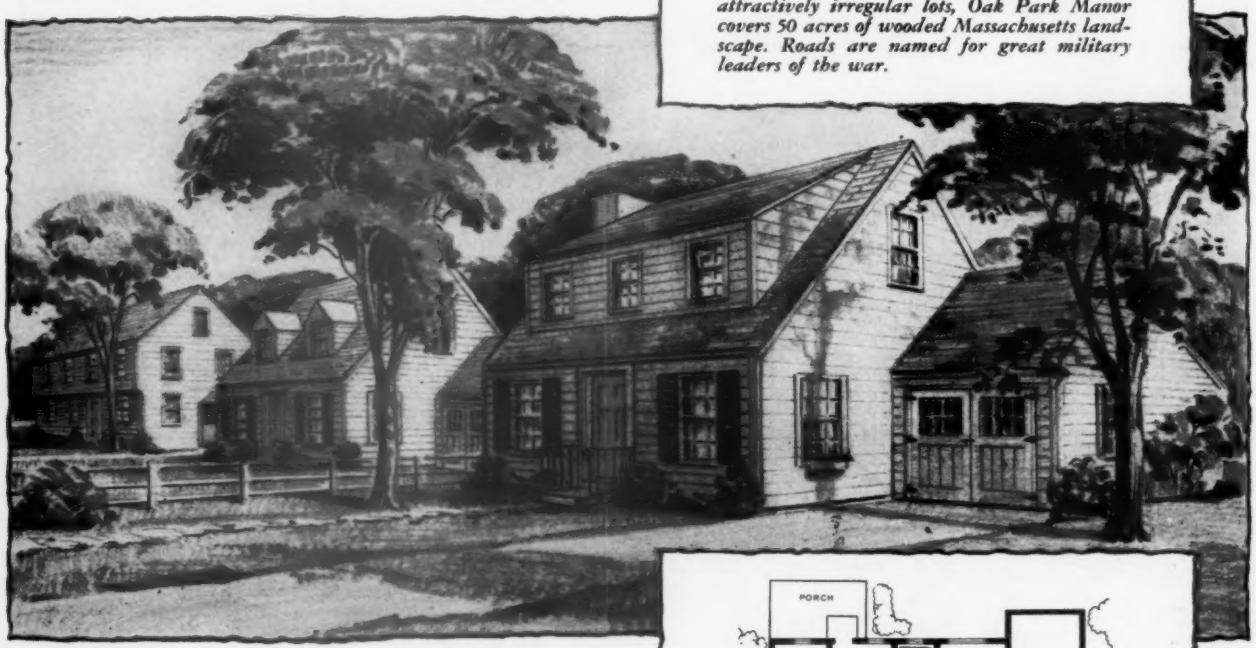
FAMILIES WILL
READ THIS AD IN JULY!
CHECK FOR YOURSELF...ONLY SERVEL FREEZES WITH
No Noise! No Wear!
IMAGINE a modern automatic refrigerator that freezes with no moving parts at all! No machinery, valves, pistons or pumps to cause noise or wear! It's a wonderfully different, simpler refrigerator—the famous Servel Gas Refrigerator.
Two million families enjoy Servels today—some have had 'em 20 years!. Ask any of them. They'll tell you—Pick Servel. It stays silent, lasts longer."
New, and finer for 1947, the famous Servel Gas Refrigerator brings you every new food-storage convenience, too. See what a beauty it is! How its extra roominess can cut your marketing trips! For frozen foods, for fresh foods, you'll find your last refrigerator investment is a permanently-silent, longer-lasting Servel Gas Refrigerator.
Look . . . New Conveniences!
✓ Big Frozen Food Compartment
✓ Plenty of ice cubes in trigger-release trays
✓ Moist cold and dry cold
✓ Convenient Servel meat storage tray
✓ Two door-action vegetable fresheners
✓ Plenty of tall bottle space
✓ Convenient egg-holder
✓ Clear-across shelves for extra roominess
✓ Shelves adjustable to eleven different positions
✓ Plastic Coated shelves (for easy-cleaning, stay rust-free, scratch-free.)
plus
✓ No moving parts in freezing system to wear or need repair
✓ Permanent silence
BIG FROZEN FOOD LOCKER
MOIST COLD, DRY COLD
NO NOISE, NO WEAR
STAYS SILENT . . . LASTS LONGER
Servel
The GAS Refrigerator
Your Gas Company and Neighborhood Gas Appliance Dealers have the new Servel. For furnished modern homes, Servel rents on Budget Gas—Trust-Gas—Kerosene. Write Servel, Inc., Evansville 20, Ind., or in Canada, Servel Ltd., 497 King St. W., Toronto 1, Ont.

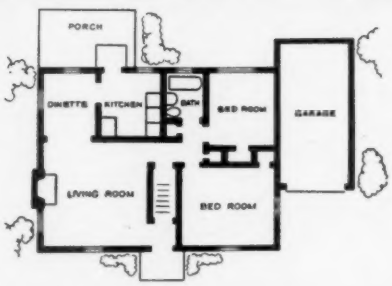
G. I. Village

MAKES HOMEOWNERS OF VETERANS IN A BRAND-NEW COMMUNITY AT NATICK, MASS.



A residential district of sweeping roads and attractively irregular lots, Oak Park Manor covers 50 acres of wooded Massachusetts landscape. Roads are named for great military leaders of the war.





With this pleasing first floor plan as a basis for all homes, buyers in the Natick development have their choice of five different exteriors of story-and-a-half and full two-story design.

Complete Bryant winter air conditioning assures cold-weather comfort in Oak Park Manor

Twenty-five miles from the city of Boston, in Natick, Mass., the construction team of Sumner D. Hersey, builder, and Richard M. Marchetti, contractor, is pushing a great Eastern veterans' housing development to its planned 1947 completion.

Oak Park Manor, dubbed "G. I. Village" by the Boston press, consists of two-hundred large building lots. Situated in a wooded tract, the development borders a 300-acre town park, where excellent facilities, including a ski run, put the accent on recreation for residents of Oak Park Manor.

All "G. I. Village" homes will be bought by veterans under the provisions of the G. I. Bill of Rights, and since the opening last year, more than half of the homes have been sold.

Oak Park Manor homes are Bryant gas-heated, using Bryant 85-BA-88 Winter Air Conditioners. The famed BA-88 is made in seven sizes with outputs from 45,000 to 200,000 btu per hour. Bryant Heater Company, 17825 St. Clair Avenue, Cleveland 10, Ohio . . . *One of the Dresser Industries.*

bryant

GAS HEATING

LET THE PUP BE FURNACE MAN

Minimizing Noise of Extinction

Design Equation Developed for Application to Large Burners

By

Earl J. Weber

American Gas Association Testing Laboratories

This article summarizes extensive data compiled at the Laboratories in extending studies from small to large burners of the type employed in central heating appliances. Essentially it is a digest of Research Bulletin No. 41, Research in Fundamentals of Noise of Extinction of Large Burners (Project DGR-6-B) just published by the Laboratories under the supervision of the Committee on Domestic Gas Research and recently released to the industry.

—Editor's Note

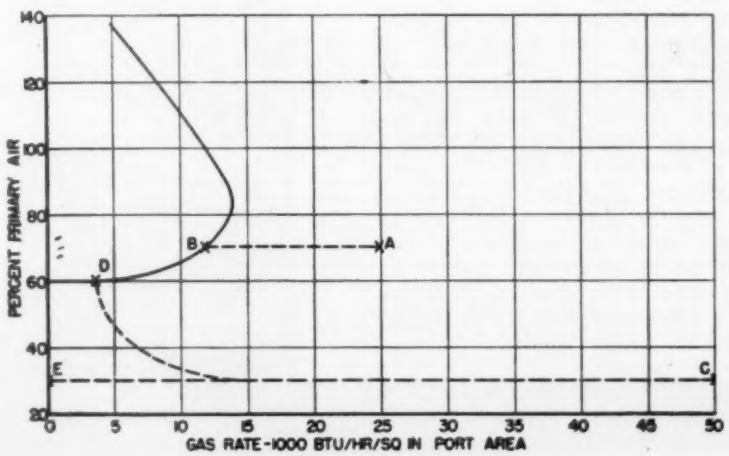
GENERALLY speaking the nature of the phenomenon of noise of extinction may be divided into two categories, depending upon the operating primary air adjustment of the burner. In the first case, with an atmospheric burner adjusted for a relatively high primary aeration, conditions for flash-back are established merely by a decrease in input rate which follows gas shut-off, and noise extinction occurs almost simultaneously with gas shut-off. This type may be defined as immediate noise of extinction.

This is shown graphically in the accompanying chart which represents a typical flash-back curve. Point "A" defines the operating adjustment of the burner before gas shut-off at an input rate of 25,000 Btu per hour per square inch of port area and a primary aeration of 70 per cent. Upon gas shut-off the input rate decreases rapidly along a line such as A, B, entering the flash-back zone at point "B". The fall in rate is probably too rapid to allow an appreciable change in the burner head mixture at the ports. If flames are present on the burner ports when the gas rate reaches point "B" they will serve as a source of ignition for the explosive mixture in the burner head and noise of extinction will result. Therefore, with the operating percentage of primary air above the lower limit of the flash-back curve, immediate noise of extinction will result.

In the second type of noise of extinction, where the burner is adjusted for a lower primary aeration, the operating air-gas mixture in the burner head must be diluted with air to produce noise of extinction as the input rate approaches zero upon gas shut-off. In other words, since the operating primary air adjustment of the burner is below the primary air value indicating the lower limit of the flash-back zone, dilution of the original mixture with air after gas shut-off is required to produce a condition of gas rate and mixture composition defining a point inside the flash-back zone. This type may be defined as delayed noise of extinction.

This second type of noise of extinction may also be demonstrated graphically. Point "C" on the chart defines the operating adjustment of the burner before gas shut-off at an input rate of 50,000 Btu per hour per sq. in. of port area and a primary aeration of 30 per cent primary air. If the burner air shutter were closed simultaneously with gas shut-off, the gas rate would decrease along a line such as C, E. Since this is not common practice, the gas rate would actually decrease along a line such as C, D due to the fact that the air-gas mixture in the burner head retains sufficient momentum after gas shut-off to induce additional air into the burner thereby increasing the air content of the original mixture. When the gas rate and mixture composition reaches point "D" at the flash-back zone, flash-back or noise of extinction will occur if flames still remain on the burner ports. The decrease in gas rate along line C, D is probably very rapid initially, slowing down considerably however as the flash-back zone is approached. The rate of decrease of the gas rate and the fact that dilution requirements to reach the flash-back zone vary with the operating primary air adjustment introduce a time element between gas shut-off and the occurrence of noise of extinction. In some instances noise of extinction may be delayed for as much as one minute after gas shut off. Undoubtedly the second type of noise of extinction is the more common in actual practice with large burners since they are usually designed for high input rates per sq. in. of port area which results in low primary aeration.

In calculating the maximum primary air with which a large burner of given design may operate on manufactured gas without noise of extinction, the following factors must



be considered: port size, port area for a given rate, and mixing tube diameter. These factors have been resolved into the following equation:

$$A = \frac{0.31}{a} \left(\frac{P}{(RD)2} \right)^{1/3}$$

Where:

A = maximum per cent primary air permissible without noise of extinction (Noise Limit).

a = area of individual port, sq. in.

P = gas pressure at orifice, in. water column

R = gas input rate per sq. in. of port area in units of 10,000 Btu per hr. per sq. in. of port area

D = mixer tube diameter 3 in. from throat, in.

Examination of this equation indicates that the noise limit is a direct function of gas pressure at the orifice and an indirect function of port size, input rate per sq. in. of port area and the diameter of the mixer tube 3 in. from the throat. Each of these variables will be considered individually in the following with the idea that the occurrence of noise of extinction is dependent upon which time element is shorter, that required for dilution to produce an explosive mixture or that required to decrease the input rate per port below the minimum rate necessary to support combustion. This conception is applied only to that condition in which the operating primary aeration is lower than the primary air value indicating the lower limit of the flash-back zone. (See chart.) This is the usual condition with large burners.

Mixer Tube

Apparently the characteristics of the mixer tube with regards to noise of extinction is entirely defined by the mixer tube diameter approximately 3 in. from the throat. Thus with all other variables maintained constant, the noise limit increases with a decrease in this diameter. Tubes of smaller diameters will offer greater restriction to the induction of diluting air. Since the motivating force or momentum is constant and the restriction increases as the tube diameter decreases, the time element for dilution to produce an explosive mixture is increased as the tube diameter decreases. Hence the noise limit increases with a decrease in tube diameter.

There is no term in the equation for length of mixer tubes since this factor was found to have no effect. The momentum of the mixture in the tube after gas shut-off should increase in proportion to the length of the tube with a resulting increase in induction of diluting air. However, this increased momentum is counterbalanced by a number of other factors.

It may be reasoned that any stack effect resulting from a difference in height between the port level and center line of the throat would add to the effect of momentum of the gas mixture in the tube. However, results of experiments designed to measure the magnitude of this effect were found to be negative.

Port Area

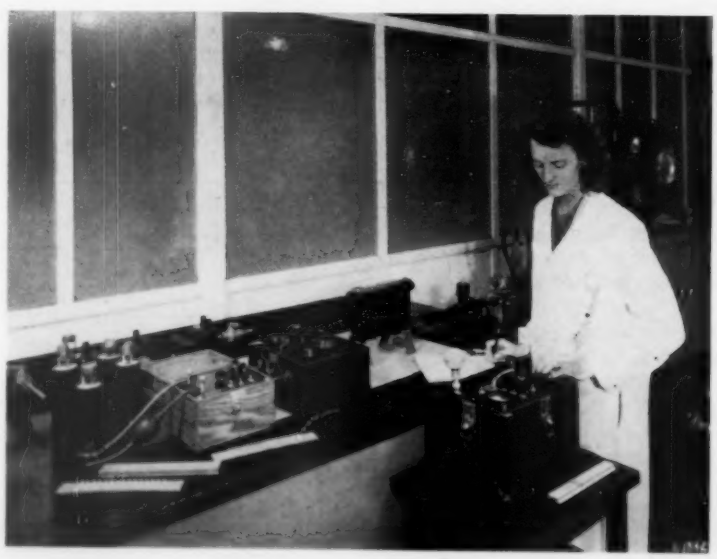
There is also no term in the equation for port area. Actually port area is indirectly a factor since for any given total gas input rate it determines rate per sq. in. of port area. However, for any given rate per sq. in. of port area the noise limit becomes independent of port area, since under this condition the ratió of total input rate to port area remains constant.

The equation indicates that the noise limit increases with a decrease in rate per sq. in. of port area. This latter factor may be varied in two ways, (1) by maintaining port area constant and varying total input rate or, (2) by maintaining total input rate constant and varying port area. Under the first condition with a fixed port area, a decrease in total input rate decreases the momentum of the gas mixture after gas shut-off, and consequently the rate of dilution.

When the input rate per sq. in. of port area is varied by a change in port area the momentum of the mixture in the tube after gas shut-off remains constant since the total gas input rate is maintained constant. The port area may be changed either by varying the number of ports of a given size or by varying the port size for a given number of ports. The latter condition may be considered in the discussion on port size. It is obvious that with a fixed input rate, the rate per port after gas shut-off will approach the minimum rate necessary to support combustion more rapidly as the number of ports is increased. Therefore a decrease in rate per sq. in. of port area resulting from an increase in the number of ports will raise the noise limit.

Maintaining all other variables including rate per sq. in. of port area constant the noise limit increases with a decrease in port size. With a given total gas input rate, the number of ports must be increased as port size is reduced in order to maintain a fixed rate per sq. in. of port area. Under this condition the same reasoning as applied in the preceding paragraph holds. From a practical view point the port area is varied by a change in port size, total input rate being held constant. In other words, total input rate and number of ports are fixed. Under this condition a manipulation of the equation indicates that the following relationship holds for a variation in port size.

$$\frac{A_1}{A_2} = \left(\frac{d_2}{d_1} \right)^{2/3}$$



Obtaining Data for Development of Empirical Formula for Noise of Extinction Limits of Large Gas Burners

Where:
A_1 and A_2 = noise limits for two different port sizes
d_1 and d_2 = port diameters for two different port sizes

Rate Per Port

Applying this relationship it may be shown that if the noise limit for a burner having No. 36 D.M.S. ports equaled 30 per cent primary air, reducing the port size to a No. 42 port for this same burner would increase the noise limit to approximately 33 per cent primary air. With the condition under discussion, that is fixed total input rate and number of ports, it may be considered that a change in port size in the range of No. 36 to 42 D.M.S. ports produces a relatively small effect on the noise limit. This would indicate that the principal factor is rate per port rather than rate per sq. in. of port area, which conclusion is somewhat supported by the fact that the time element required to approach the minimum rate necessary to support combustion is a function of the operating rate per port. It is to be noted, however, that rate per port is not entirely the controlling factor. As port size is decreased the primary air value indicating the lower limit of the flash-back zone increases. Consequently with a decrease in port size more dilution of the original air-gas mixture in the burner is required in order to produce a mixture which will be in the flash-back zone.

A consideration of a limiting port size for noise of extinction indicates that it should be possible to reduce port size to a value at which noise of extinction would not occur regardless of the magnitude of the other factors in the equation. This limiting port size which would by itself prevent noise of extinction would probably be reached sometime before the maximum rate of the flash-back limit for that particular port is less than the minimum rate necessary to support combustion.

Orifice Pressure

The remaining factor is orifice pressure. The fact that the noise limit is a direct function of orifice pressure may be explained as follows. Assume a burner is rated at 2 in. pressure with the air shutter adjusted so that noise of extinction just occurs. In other words, primary air injection is slightly higher than the noise limit. If the burner is now rated at 6 in. pressure and the air shutter is adjusted to obtain the same primary air injection as with the 2 in. pressure, the air shutter will be more nearly closed because of the better injection characteristics of the 6 in. pressure condition. However, the air shutter in the more nearly closed position will offer greater restriction to the induction of diluting air after gas shut-off and hence noise of extinction should not occur for the 6 in. pressure condition. Thus for any increase in orifice pressure the noise limit will increase.

Any outside condition which affects the time element required for dilution to form an explosive mixture or the time element required for the rate per port to drop below the minimum rate necessary to support combustion will affect the value of the constant in the equation. Thus the nature of the gas supply influences the shape and size of the flash-back zone and hence the dilution requirements. Specific gravity of the gas influences the momentum of mixture in the tube after gas shut-off. Negative pressures in the combustion chamber will add to the momentum of the mixture especially if the mixer face is located outside of the chamber. On the other hand secondary air drafts across the mixer face may subtract from this momentum. Finally secondary air flow past the ports will affect minimum gas rates required to support combustion.

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be considered: port size, port area for a given rate, and mixing tube diameter. These factors have been resolved into the following equation:

$$A = \frac{0.31}{a} \left(\frac{P}{(RD)2} \right)^{1/3}$$

Where:

A = maximum per cent primary air permissible without noise of extinction (Noise Limit).

a = area of individual port, sq. in.

P = gas pressure at orifice, in. water column

R = gas input rate per sq. in. of port area in units of 10,000 Btu per hr. per sq. in. of port area

D = mixer tube diameter 3 in. from throat, in.

Examination of this equation indicates that the noise limit is a direct function of gas pressure at the orifice and an indirect function of port size, input rate per sq. in. of port area and the diameter of the mixer tube 3 in. from the throat. Each of these variables will be considered individually in the following with the idea that the occurrence of noise of extinction is dependent upon which time element is shorter, that required for dilution to produce an explosive mixture or that required to decrease the input rate per port below the minimum rate necessary to support combustion. This conception is applied only to that condition in which the operating primary aeration is lower than the primary air value indicating the lower limit of the flash-back zone. (See chart.) This is the usual condition with large burners.

Mixer Tube

Apparently the characteristics of the mixer tube with regards to noise of extinction is entirely defined by the mixer tube diameter approximately 3 in. from the throat. Thus with all other variables maintained constant, the noise limit increases with a decrease in this diameter. Tubes of smaller diameters will offer greater restriction to the induction of diluting air. Since the motivating force or momentum is constant and the restriction increases as the tube diameter decreases, the time element for dilution to produce an explosive mixture is increased as the tube diameter decreases. Hence the noise limit increases with a decrease in tube diameter.

There is no term in the equation for length of mixer tubes since this factor was found to have no effect. The momentum of the mixture in the tube after gas shut-off should increase in proportion to the length of the tube with a resulting increase in induction of diluting air. However, this increased momentum is counterbalanced by a number of other factors.

It may be reasoned that any stack effect resulting from a difference in height between the port level and center line of the throat would add to the effect of momentum of the gas mixture in the tube. However, results of experiments designed to measure the magnitude of this effect were found to be negative.

Port Area

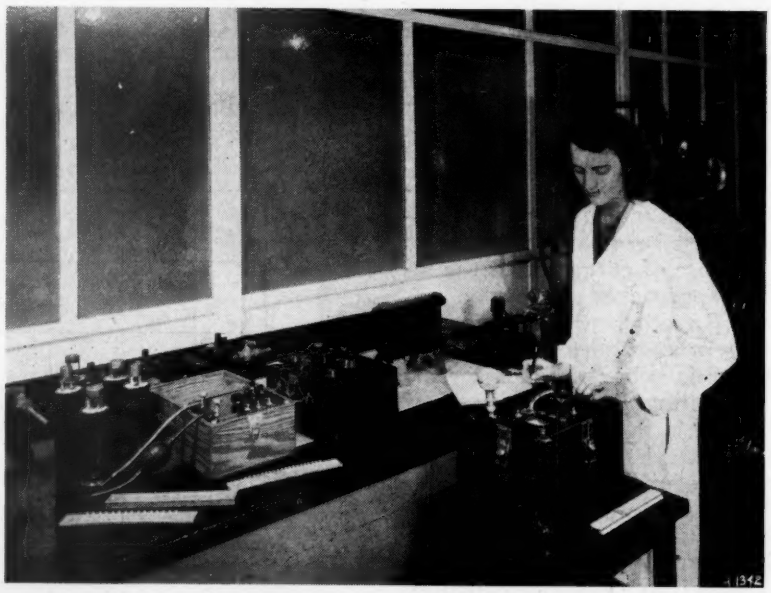
There is also no term in the equation for port area. Actually port area is indirectly a factor since for any given total gas input rate it determines rate per sq. in. of port area. However, for any given rate per sq. in. of port area the noise limit becomes independent of port area, since under this condition the ratio of total input rate to port area remains constant.

The equation indicates that the noise limit increases with a decrease in rate per sq. in. of port area. This latter factor may be varied in two ways, (1) by maintaining port area constant and varying total input rate or, (2) by maintaining total input rate constant and varying port area. Under the first condition with a fixed port area, a decrease in total input rate decreases the momentum of the gas mixture after gas shut-off, and consequently the rate of dilution.

When the input rate per sq. in. of port area is varied by a change in port area the momentum of the mixture in the tube after gas shut-off remains constant since the total gas input rate is maintained constant. The port area may be changed either by varying the number of ports of a given size or by varying the port size for a given number of ports. The latter condition may be considered in the discussion on port size. It is obvious that with a fixed input rate, the rate per port after gas shut-off will approach the minimum rate necessary to support combustion more rapidly as the number of ports is increased. Therefore a decrease in rate per sq. in. of port area resulting from an increase in the number of ports will raise the noise limit.

Maintaining all other variables including rate per sq. in. of port area constant the noise limit increases with a decrease in port size. With a given total gas input rate, the number of ports must be increased as port size is reduced in order to maintain a fixed rate per sq. in. of port area. Under this condition the same reasoning as applied in the preceding paragraph holds. From a practical view point the port area is varied by a change in port size, total input rate being held constant. In other words, total input rate and number of ports are fixed. Under this condition a manipulation of the equation indicates that the following relationship holds for a variation in port size.

$$\frac{A_1}{A_2} = \left(\frac{d_2}{d_1} \right)^{2/3}$$



Obtaining Data for Development of Empirical Formula for Noise of Extinction Limits of Large Gas Burners

Where:
A_1 and A_2 = noise limits for two different port sizes
d_1 and d_2 = port diameters for two different port sizes

Rate Per Port

Applying this relationship it may be shown that if the noise limit for a burner having No. 36 D.M.S. ports equaled 30 per cent primary air, reducing the port size to a No. 42 port for this same burner would increase the noise limit to approximately 33 per cent primary air. With the condition under discussion, that is fixed total input rate and number of ports, it may be considered that a change in port size in the range of No. 36 to 42 D.M.S. ports produces a relatively small effect on the noise limit. This would indicate that the principal factor is rate per port rather than rate per sq. in. of port area, which conclusion is somewhat supported by the fact that the time element required to approach the minimum rate necessary to support combustion is a function of the operating rate per port. It is to be noted, however, that rate per port is not entirely the controlling factor. As port size is decreased the primary air value indicating the lower limit of the flashback zone increases. Consequently with a decrease in port size more dilution of the original air-gas mixture in the burner is required in order to produce a mixture which will be in the flash-back zone.

A consideration of a limiting port size for noise of extinction indicates that it should be possible to reduce port size to a value at which noise of extinction would not occur regardless of the magnitude of the other factors in the equation. This limiting port size which would by itself prevent noise of extinction would probably be reached sometime before the maximum rate of the flash-back limit for that particular port is less than the minimum rate necessary to support combustion.

Orifice Pressure

The remaining factor is orifice pressure. The fact that the noise limit is a direct function of orifice pressure may be explained as follows. Assume a burner is rated at 2 in. pressure with the air shutter adjusted so that noise of extinction just occurs. In other words, primary air injection is slightly higher than the noise limit. If the burner is now rated at 6 in. pressure and the air shutter is adjusted to obtain the same primary air injection as with the 2 in. pressure, the air shutter will be more nearly closed because of the better injection characteristics of the 6 in. pressure condition. However, the air shutter in the more nearly closed position will offer greater restriction to the induction of diluting air after gas shut-off and hence noise of extinction should not occur for the 6 in. pressure condition. Thus for any increase in orifice pressure the noise limit will increase.

Any outside condition which affects the time element required for dilution to form an explosive mixture or the time element required for the rate per port to drop below the minimum rate necessary to support combustion will affect the value of the constant in the equation. Thus the nature of the gas supply influences the shape and size of the flashback zone and hence the dilution requirements. Specific gravity of the gas influences the momentum of mixture in the tube after gas shut-off. Negative pressures in the combustion chamber will add to the momentum of the mixture especially if the mixer face is located outside of the chamber. On the other hand secondary air drafts across the mixer face may subtract from this momentum. Finally secondary air flow past the ports will affect minimum gas rates required to support combustion.

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The Control of Gum-Formers in Carburetted Water Gas

By
E. J. Murphy
Chief Chemist
The Brooklyn Union Gas Co.

MORE than twenty years ago the gas industry began to recognize the gum problem in distribution systems and meters. Since then considerable information has become available on the cause and prevention of gum troubles and it would seem, in the light of this information, that we should be well past the need for further discussion; but many of us still have customer complaints in the form of pilot outages on appliances, sticky meters, and service pipe stoppages.

It is my purpose to discuss the subject of gum-formers from the standpoint of the liquid phase product, touching on vapor phase gum only incidentally as the occasion warrants. It is true that vapor phase gum is found in appreciable amounts in carburetted water gas but it has never been a real problem, at least in Brooklyn.

We, like other companies, have made considerable increases in send-out in the last year or two and while straining to meet this load under present day conditions it was inevitable that the efforts of our operating forces to reduce gum-formers in the gas to a minimum came to be a considerable task, especially during the winter peaks. It was a question of getting the gas out and doing everything possible to minimize gum troubles at the same time. I should like to tell you something of our problem and the means we used in the attempt to control disturbances due to gum deposits. I should like to describe our present light oil scrubbing facilities which, when finally completed, will be a process suited to our needs for sending out a gas low enough in gum content so as to cause little or no trouble on appliances. To complete a discussion of our experience it will be necessary to indicate the importance of controlling gum-formers during peak hours, show how overflowing drips can affect the problem, and relate some advantages in the use of inhibitors and filters under certain conditions.

To prevent gum trouble, condensible oils containing styrene and indene must be kept from leaving the plant. This is true, but not quite so simple. If the economies in different localities were much as to allow oil scrubbing the gas the matter of gum control would be simplified. Since this is not so other methods have been advanced which may or may not be satisfactory in specific cases. Proposals to control gum range from removal of organic sulphur and oxygen to the reduction of condensibles by super-condensation, compression with after-cooling, and oil scrubbing.

Whatever the individual case, reasons for not processing gas for gum-former control must be balanced against the overall benefit attained in making gas gum-free with its important contribution to good customer relations. Consider also the matter of trouble-free gas in the light of a not too distant competitive situation.

Oil Scrubbing

In Brooklyn we have elected to remove gum-formers at the plant by oil scrubbing the gas. Our process represents some new ideas developed by A. B. Huyck, Assistant Chief Engineer, and others, and was placed in operation last winter. Since then some changes were found necessary and it is expected that the plant will be ready for efficient operation before next winter. The final arrangement will consist of three scrubbing units of the "open shell" type with recirculating oil sections at lower ends and fresh oil sections at the upper ends. All sections are or will be filled with a newly developed spiral metallic packing. Two of the units were formerly of the two-pass type having a vertical partition through the center which separated the recirculated and fresh oil. This partition acted as an internal connection between the two vertical sections. Figure I shows the present arrangement of the complete process, both scrubbing and stripping. Changes are to be made so as to make #3 scrubber the same as #1 and #2.

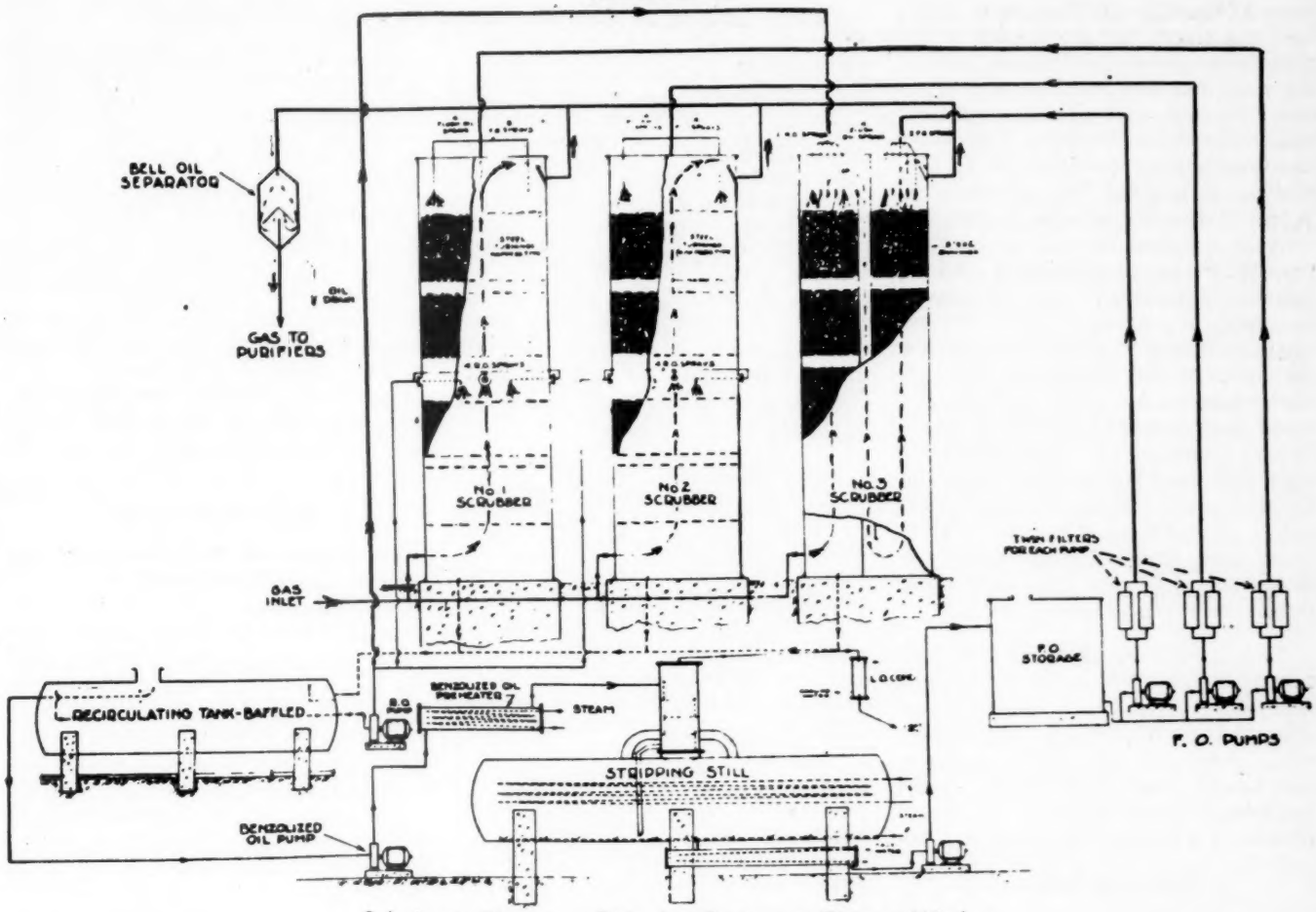
An immediate effect of revamping the old scrubbers to the new type was an increase of capacity per unit. Pressure drops were considerably reduced so that at present the differential is now less than one inch when passing nearly one million c.f. per hour through each unit. It is now confidently believed that these units will meet all the principles of good scrubbing design: that is, low back-pressure, long time of contact between oil and gas, avoidance of stagnant films at absorption surfaces, and use of counter-current flow.

Accessory equipment consists of centrifugal pumps for fresh oil and heavy duty reciprocating pumps for recirculating oil. Cloth filters follow the fresh oil pumps to protect the sprays. Good wetting distribution of the scrubber packing is obtained with Sprayco type heads. There are also sets of sprays installed for flushing purposes, if required. Important in the system is a baffled tank which acts as storage for spent or benzolized oil taken from the bottom of the scrubber seals. It also acts as a feed for recirculating oil pumps and finally as an oil clarifier effecting a separation of water and sludge from the spent oil on the way to the stripping plant.

A continuous light oil stripping plant completes the system. It is an arrangement of a simple four plate rectifying column mounted on a horizontal still formerly used for dehydrating heavy oil tar. The spent oil, as it arrives for stripping, is preheated to 325°F and fed to the top of the 3rd plate of the column where light oils with gum-formers start to distill off and are carried to a condenser. The partially stripped oil leaving the rectifier enters the bottom of the horizontal still where further and complete separation is accomplished by low pressure sweep steam distillation through the entire body of the oil. The resultant vapors —steam and light oil—are carried to the first plate of the rectifier enabling temperature control and reflux action to be maintained. The debenzolized oil, after cooling, is sent to storage from which point it is pumped to the scrubbers for further work.

In order to get the best possible results in gum-former removal it is essential that proper fresh and recirculated oil rates be maintained. It is also quite necessary to control the gas temperature to a point not higher than 80°F. and an oil temperature not higher than 85°F. Oil after stripping, and ready to use again, is fresh oil and should not contain more than 1% by volume of light oils.

FIGURE 1



Schematic Diagram—Stripping System at Citizens Works

It has been our experience that with a fresh oil rate of 600 gallons per million c.f. and a recirculated oil rate approximately twice this figure, a 95% removal of oils condensible at 32°F is obtained. Based on certain tests we have reason to believe that a fresh oil rate of 1000 gallons per million c.f. will make unnecessary the need for recirculation. Further study is being given to this point.

Oil scrubbing of gas under peak load conditions must be given particular attention if gum troubles on appliances are to be avoided. What generally happens during peaks is out of line temperature conditions and every effort should be made to hold a set of maximum operating temperatures at the condensers. Average hourly readings are at best only of limited use. Particular heed should be given to condenser capacity and maintenance. Fouled condenser equipment of the tubular type sets up an insulating effect and prevents proper heat transfer from gas to cooling water. It is absolutely necessary to maintain temperature of the gas entering the scrubber around 80° if a good job of removing gum is to be assured. It is during the peak hours that oily condensibles are more apt to leave the plant and it is deemed good engineering practice to design cooling equipment so that scrubbing facilities may function properly under conditions developed by maximum loads.

One final word on the subject of scrubbing. A factor frequently overlooked is the quality of the oil used. Successful operation is directly dependent upon oil quality, particularly in respect to pumping and spray equipment. This is especially so where light oil recovery is concerned. Excellent absorbent oils of high heat stability and narrow boiling range are available. Even where no light oil recovery is practiced it is advisable to choose a good free-flowing gas oil with certain characteristics. There is, of course, in this case, a matter of economics to be considered if gas oil after use in scrubbers is sent to the carburetors.

Effect of Drip Oils

The accumulation of condensible oils in transmission and distribution systems bears an important relation to gum complaints on appliances. It has been our past experience that wherever a considerable amount of drip oil was present in the transmission system there was a marked increase of customer complaints in certain localities. Gas stoppages due to gum were responsible for most of these complaints. Analyses of deposits found in pilots and controls of appliances that failed to function properly indicated that they were principally liquid phase gum.

Although we understood the way drip oil was obtained and were familiar with its properties it was at first difficult to account for the presence of gummy material in appliances. It was finally agreed that gum was deposited in appliances in the following manner: At times of normal consumption a mixture of water, oil and gum was formed in low spots in the mains or by the overflowing of drip pots; when the demand for gas was high, the gas flowed through the main very rapidly and in a turbulent manner; the condensate was carried by the gas to the district governor; the drop in pressure across the governor served to atomize the mixture into the distribution system as a fog of drip oil which contained gums; the oil gradually evaporated, leaving gum in the gas as minute particles, some of which deposited on needle valves of pilots and controls.

The need for close attention to the pumping of drip pots, especially during situations where it becomes impossible to completely control condensible oils at the plant, may best be illustrated by examples of recent ex-

periences. In December, 1945, we were advised by our Customers Service Department that the number of refrigerator complaints in one of our districts had increased greatly. This was at a time before our scrubbing facilities were re-designed. Normally, the number of complaints in this district was about 5% of the total reported for all districts but at the time in question the figure went up to 40%. From a transmission map we selected a governor which appeared to supply the affected area. At our request the Street Section pumped the drip pots at both inlet and outlet of the governor and their report indicated that the inlet side had overflowed. Both pots were pumped daily thereafter and within a few days the number of complaints decreased gradually. A week later the complaints diminished from 40% to 9% for all districts and by the following week conditions were again normal.

On various occasions since that time similar conditions were noted in other districts and each time the condensate from the drip pot of the governor involved was found to have overflowed into the main. Daily pumpings soon reduced the complaints to a normal figure.

Pumping Drips

It seems apparent that where circumstances prevent the proper control of oily condensate at the plant every effort should be made to pump drip pots in disturbed areas so as to prevent overflow into the mains. This would be a major problem in Brooklyn if we had to depend solely upon this method of controlling the effect of accumulating drip oils. We have approximately 8000 drips in our territory. Some of these may be active at times and inactive at others, depending on gas flow and pressure. What used to complicate our problem was the presence of many so-called suction drips and low spots in the mains. When oil containing gum-formers and dissolved gum deposited at these points in sufficient amounts little could be done to control trouble in nearby appliances.

TABLE 1

Effect of Pumping Drips on Appliance Stoppages

Period (December-March)	*Number of Refrigerator By pass Stoppages per M Refrigerators*	*Gallons of Drip Oil Pumped from System*	*Number of Refrigerator By-pass Stoppages per M Refrigerators per M Gallons of Drip Oil*
1942-43	68	11,005	6.2
1944-45	242	39,877	6.1
1945-46	85	27,125	3.1
1946-47	93	29,560	3.1

Some indication may be seen in Table I as to the beneficial effects of pumping drips on appliance complaints. The gallons of drip oil removed from the mains during the months December through March are given, together with the number of by-pass stoppages per 1000 refrigerators for the same period. From these data are calculated the stoppages per 1000 refrigerators per 1000 gallons of drip oil. In November, 1945, the schedule of pumping drips was accelerated in an effort to reduce the number of appliance complaints anticipated the following winter. In addition, the drip pots located in territories where gum complaints increased markedly were pumped as soon as the condition was reported. As mentioned previously, in most of these instances there was an overflow into the main.

It is interesting to note that the calculated figures in the table for the number of by-pass stoppages per 1000 refrigerators per 1000 gallons of drip oil during the periods in which pumping was accelerated (1945-6 and 1946-7) are about 50% less than those for preceding periods (1942-3 and 1944-5). This would indicate that, when the control of condensibles at the plant gets out of hand, complaints can be minimized by intensive pumping schedules. It is not to be thought that this method is a satisfactory substitute for oil scrubbing but when a a situation arises where something has to be done it does help.

Appliance Filters

An important contribution to the control of complaints due to gum is found in a filter attached to appliances. At the beginning there seemed to be a question in the industry about the usefulness of filters where liquid phase gum particles were the cause of stoppages. The difference of opinion was probably influenced by the fact that filtering devices were originally intended to minimize stoppages produced by the presence of vapor phase gum. In Brooklyn we have been dealing with liquid phase variety of gum for over 10 years. Appliances on our lines have never been bothered to any extent by stoppages brought about by vapor phase gum except during a period in 1943 when our Maspeth Avenue holder was taken out of service for repairs. This holder performed an important function in that components producing vapor phase gum reacted within it thereby preventing gummy end products from passing out to the distribution system.

During the last several years we have made many microscopical examinations of deposits on needle

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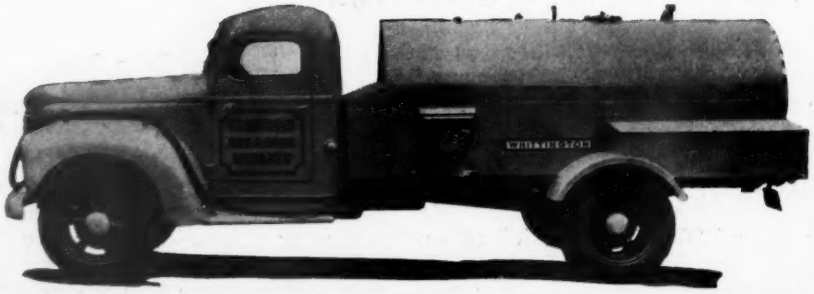

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valves and controls. In practically all cases liquid phase gum was found. In some instances the vapor phase product and corrosion products were also found but the evidence was conclusive in showing that liquid phase gum was the primary cause of our appliance complaints.

About 9 years ago approved filters were attached to pilot burners and installed at three widely separated locations. At the same time three burners without filters were set up at these points. Up to 1945, when we removed the burners, those with filters operated satisfactorily without diminution of flame height. On the other hand, burners without filters were definitely affected, the flame being extinguished frequently during the 7 years of operation. During a recent winter peak when abnormal amounts of drip oil got into the system only 2 filters out of several thousands attached to refrigerators failed, which is an excellent record for any filtering device considering the condition prevailing at the time.

Filters must be of an approved type if they are to perform properly and they will continue to be important even after effectual selective scrubbing out of gum-formers is attained. The build-nup of past deposits in the mains make it imperative to insure against appliance stoppages for some time or until these gum deposits are no longer able to make truble.

The installation of proper filters on future purchases of appliances, including ranges, refrigerators, water heaters, and house heaters must be considered seriously. Certain makes of water heaters will need a filter large enough to pass all the gas due to the type of thermostatic control used. We have made the filter standard equipment for pilots of gas appliances sold. We also install filters on existing appliances when the occasion requires.

Diaphragm Dressings

One further experience touching on the gum problem had to do with the scrubbing action of oils used in meter diaphragms. It is a well known and established fact that condensible light oil vapors in manufactured gas are absorbed by the oil dressing and, depending upon the quantity and composition of the oil, meter diaphragms may be bleached and become tacky or hard after being in service over a period of years.

Several years ago we had some trouble with hardened leathers in meters located in certain territories. To prevent this condition and thus prolong life the diaphragm oils used in a number of meters were treated with an inhibitor in the early part of 1941. About 3% by volume of an inhibitor known as "Loosol" was used.

After being on customers premises for periods up to 3 years some of these treated meters were brought in for inspection. The general condition was found to be satisfactory, resistance to gum polymerization being of a high order. Not a single diaphragm showed evidence of being tacky to touch. These observations were encouraging because a majority of test meters was installed in districts where many appliances failed to operate because of gum deposition.

Despite the fact that this inhibitor gave such good results its odor was so disagreeable that its application was discontinued. A very effective substitute was found which recently has been brought on the market. It is designated as para-tertiary butyl catechol. Evalution tests in the laboratory indicated that the addition of 1% by weight gave results very comparable to the inhibiting effect of 3% by volume of "Loosol."

About 3 years ago our meter shop began treating diaphragms for meters with dressing oil containing the new inhibitor. Arrangements have been made whereby some of these meters will be brought in for inspection.

The paper presented here represents, in general, our experience in Brooklyn over the past years. It is in a sense a description of the methods we had to use at one time or another to overcome gum complaints in our territory. Like others, we have had a problem at times but we feel certain that when our scrubbing and stripping plants are finally completed appliance stoppages will be brought to a minimum. I hope our experiences offer something that may contribute to helping offset the effects due to gum in your own local situations.

Presented at meeting New England Gas Assn., Operating Division, Worcester, Mass., May 15th, 1947.

Milwaukee Prepares for Adequate Gas Supply

So far as factors within the control of the Milwaukee Gas Light Co. are concerned, it will be equipped to provide adequate service next winter even under the most adverse weather conditions. This assurance was given to the Public Service commission April 15 by Erwin C. Brenner, vice president in charge of operations. He testified at a combined hearing on the company's petition for approval of installation of 20 additional storage tanks for liquefied petroleum, and on the commission's own motion for inquiry into the service prospects for next winter. The added tanks will make a total of 40 with a capacity of one million gallons. The year round commitments will require an average of not more than 1,350,000 gallons a month.

The Utilitarian

Bendix Appoints Russell to Contact Utilities

J. Warren Russell has been named by W. F. Linville, general sales manager, to contact electric and gas utilities in the eastern region of the United States for Bendix Home Appliances, Inc. He joined the manufacturer of the Bendix automatic washer 15 months ago as a special representative. He will continue to headquarter in Garfield, N. J.

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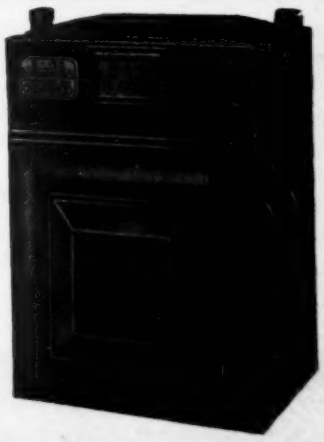

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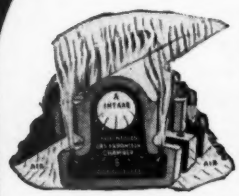

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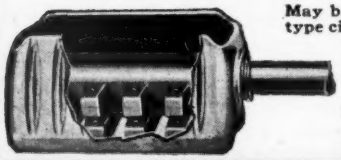

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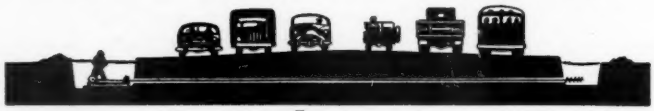

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Our Billion-Dollar Side-Show

By

H. H. Anderson,

Vice President Shell Pipe Line Corporation

OUT OF SIGHT, out of mind. When Mike Jacobs can draw a million-dollar gate at the Stadium for a one-round main event, we concede that Barnum was right. But what about us in industry who are needlessly paying billions for a show we can't even see? I refer to soil corrosion—Nature's relentless attack on our buried pipe lines, power and communications cables, rail systems and other metal structures. And I say "needlessly" because much of the damage can be stopped by Cathodic Protection if we will appreciate and apply this simple principle disclosed by Sir Humphrey Davy in 1824!

The annual cost of pipe line replacements due to corrosion is approximately 200 million dollars per year, according to Bureau of Standards reports. In this paper, presented at the Conference, National Association of Corrosion Engineers, Chicago, April 7, 1947, Mr. Anderson discusses in non-technical terms, the principles and results of galvanic protection. —Ed.

A Speaking Acquaintance

Cathodic Protection can save industry from myriad costly service breakdowns, commodity losses, customer ill-will and plant repairs and renewals. Yet many corrosion engineers tell me that a prime limitation on its use is that Management is not yet sold on it. These ardent exponents know how simply it works, how great is its value, how tangible is its economy, and how it warrants broader acceptance. Thus I suspect many engineers have confused instead of enlightened the boss with too much detail while trying to explain facts that seem obvious to them. Believing that every operating executive owes it to his business to be at least on speaking terms with Cathodic Protection, I beg to introduce you herewith.

Dust Thou Art

Let's raise the iron curtain on this billion-dollar show. We started it ourselves when we buried our refined metal structure bare (or practically so) in the soil. This upset Mother Nature's age-old chemical balance, and the old Dame promptly started soil corrosion at work to restore it. Soil corrosion of metal is caused by a localized attack of soil chemical solutions. It starts where the soil is more moist and acid or alkaline than average, or it can start at a defect in the metal surface. It generates electric currents which flow from the point of attack out through the soil back elsewhere to the metal.

Assault and Battery

You recall that in a common battery the solution attacks the zinc or baser metal, called the "anode," to generate a current. This current flows out through the solution to the carbon, called the "cathode," thence through a metallic circuit back to the anode. And what of our buried structure? Contacted by the varying soil solutions of Nature, its bare surface serves both as anode (the area under attack) and as cathode (the rest of its surface) because its metallic continuity forms a circuit between them. As shown in Figure 1, if our structure is long (or is of large area) it can be a part of many such natural batteries, and thus it can have a series of anodic and cathodic sections.

Jekyll and Hyde

Soil moisture, that well-known H_2O, plays a dual role in our subterranean melodrama. Figure 2 shows a molecule at work! During the chemical attack some of the water divides into hydrogen and oxygen, each going its separate way. Oxygen is the one that attacks our structure. Its corrosive atoms create an anode,

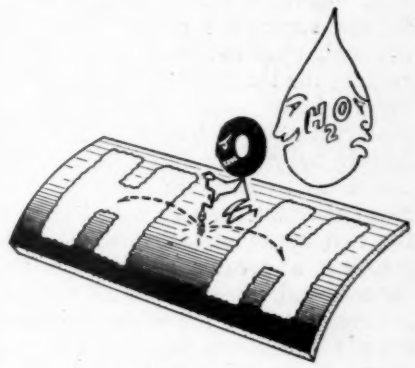

FIGURE 2.

which responds with a weak but determined electric force that sends currents out through the soil seeking a cathode. But hydrogen rushes to the rescue. Its atoms ride the currents through the soil and cover the rest of the bare surface. Soil chemicals cannot pierce the hydrogen film, thus it shields all but the immediate area under attack; i.e., it protects the metal by forming a cathode. Eureka! There's a clue to Cathodic Protection. If we can cover *all* of the surface with enough hydrogen we may protect it completely.

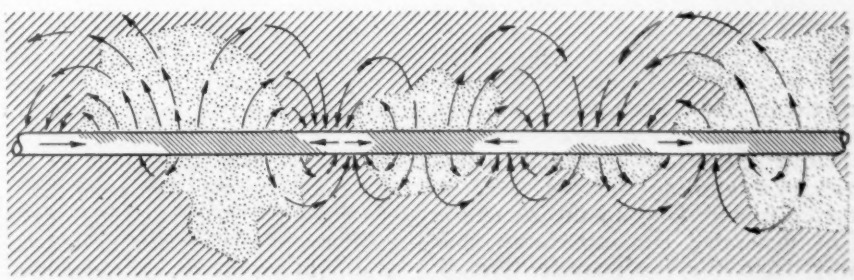

Figure 1. Series of batteries caused by attack of patches of sour or moist soils along a structure. Arrows show currents flowing from anodic (areas of attack) to cathodic areas.

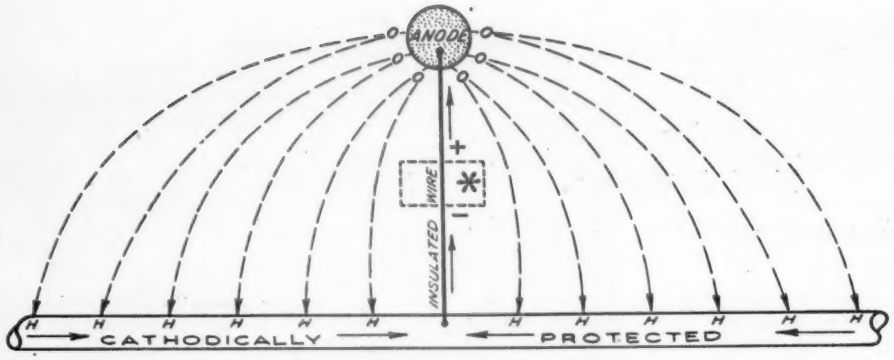

FIGURE 3.

Long structure showing currents from buried anode entering structure. All oxygen attack is at anode. Structure is entirely protected by hydrogen.

* Generator may be placed here if galvanic anode is not used.

The Sacrifice

And how is this to be done? As they say in the movies, we merely get a "stand-in" or a substitute anode. Through it we can apply other currents strong enough to enter our structure's entire surface via the soil, thus overpowering and reversing the local battery currents trying to leave. The simplest way to protect a *steel* or *lead* structure is to merely bury a chunk of baser metal (such as magnesium, aluminum or zinc) near the structure, and connect the two by an insulated wire. Oxygen has a greater affinity for this baser metal, so—as long as the two are connected by the wire—it instead attacks the baser metal! This responds more vigorously and forces much stronger currents out through the soil en route to our structure. As shown in Figure 3, hydrogen again rides them all and makes a cathode of its entire surface—even the areas before under attack. The currents return from the structure to the baser metal anode through the wire. In the process, the baser metal instead of our structure is slowly oxidized or corroded away. Biblically speaking, it lays down its life for a friend. That's why we call it a sacrificial (or "galvanic") anode.

A Knock-Out Punch

Some soils are so corrosive as to require stronger measures. Here we may bury a mass of junk iron or steel (or a carbon rod) nearby to serve as the anode. Then with insulated wires we connect a strong external direct-current source, such as a 10-volt generator or rectifier, (+) to the junk and (—) to the structure. The generated currents force their way from the junk anode through the soil into the structure and smother it with hydrogen. The junk will be eaten away in time and must be replaced. A single such unit, being ten times more powerful than a galvanic anode, can protect several miles of structure under some conditions. The choice of a current-supply in each case poses some nice problems, not only in meeting the need but also in the balancing of first costs versus recurring expenses.

Rags and Tatters

Our buried structure can be protected also with special enamels or coatings. But only during the last few years have we learned how to apply these properly. There's many a mile (and acre) of structure with defective coatings; and these may be worse than none because such defects act to focus corrosion and localize pitting. What are we to do about them? The cold sod is a poor and expensive place in which to apply new coatings, anyhow. Thus, if our structure's present coat is tattered, Cathodic Protection may provide safety with economy.

They Hide the Body

When installing new metal structures, many shrewd operators know that a modern enamel coating, properly applied, plus *some* Cathodic Protection is best economy in the long run. They never can infallibly predict the soil action along a new route, and they know it costs about five times as much to later dig up, clean, repair and coat a line than to coat it right in the first place. They know also that a bare metal structure must be extra thick to allow for corrosion pitting, and that this extra metal costs about as much as a good coating. But even the best of coatings may develop defects (either while being buried or later); so a light supply of hydrogen should be on guard to fill the holes. Thus *some* Cathodic Protection is good insurance even on a newly-coated line.

At the Crossroads

It looks as if that should end our troubles, but no. For better or worse, every current must flow back to its source. If a neighbor's metal structure is adjacent, or if it crosses but does not touch ours, and it is within the field of the currents flowing from our protective anodes to our structure, some of the generated current may possibly "stray"into his structure (which provides a low-resistance path) and flow through it to the point nearest ours. There the current must leave his structure to jump through the soil back into ours and return to its source. We saw before that chemical attack on metal will cause current flow. Well, it also works in reverse! Where our stray current leaves his structure to enter the soil, it may cause chemical attack or local corrosion. This action is called "electrolysis."

Out of the Pit

Electrolysis can be as bad as true soil corrosion because, with either one, a current flow of one ampere in a year will destroy 20 pounds of steel or iron, or 75 pounds of lead. And both usually focus to cause pitholes which soon pierce our structure. Electrolysis can be avoided by connecting a resistant wire or "bond" between the two structures to drain the returning stray current from the adjacent structure into the protected one. This "drainage bond" must be well-designed, however, because too little drainage will not stop the interference, while too much will give our neighbor real Cathodic Protection at our expense. We want to be friends, don't we—but not philanthropists! It was said above that a good coating reduces the current needed to cathodically protect our structure. The lesser current, in turn, reduces the chance for electrolysis to occur!

City Slickers

Strong stray currents from electric railway tracks have long caused electrolysis of other buried structures in cities. Several competent local committees have worked for years to minimize this action. However, with the steady conversion by transit companies to motorbus and double-trolley coach service, that trouble is abating through removal of its cause. Conversely, true soil corrosion is spreading in cities because removal of the stray currents allows the weaker currents of Nature's batteries to flow unopposed. Thus city operators, too, must increase their interest in Cathodic Protection.

The Denouement

If we want to use Cathodic Protection, we can ill-afford to interfere with neighboring structures by electrolysis. Yes, and our neighbors can ill-afford to have this done. But decorum tells us that our corrosion engineer should not trespass the other structures—even to make the tests needed to design the drainage bonds. However, if our neighbors also are acquainted with the problem and will cooperate for the common good, they will welcome the tests, the technical details can be readily worked out, the bonds can be installed and all structures will be benefited.

Quintessence

Often we may want to install Cathodic Protection where a neighbor's structure parallels ours for quite a distance. Then his structure will absorb much of our precious current and need several drainage bonds merely to prevent interference. Here we often can save money by inducing him to install Cathodic Protection, too. And why not, if his structure lies in the same corrosive soils? Several large companies have installed many protection units jointly. Capital as well as operating expenses are shared equitably, and with mutual satisfaction. Here, again, acquaintance with the general problem at the management level aids the engineers to work for maximum protection and economy. Such results help the customers, and please the stockholders!

Summing It Up

As the curtain drops on our show, we can take stock. Does Cathodic Protection work simply? In essence, yes; we just get a current source or anode and spray on a little hydrogen. Is its value great? Why not—if it stops the corrosion. Does it need a special kind of cooperation? It doesn't if we are all acquainted with its problems and will follow the Golden Rule. But what about its tangible economy? If you are not already sold, a good corrosion engineer probably can prescribe it for your own structures and soon convince you of its economy. But to stress my main point, you can see that cooperation with others in Cathodic Protection is good business.

They Also Serve

The problems of Cathodic Protection aren't really as simple as I've made them seem. Their solutions call for data, science and experience mixed with plenty of plain horsesense. But our corrosion engineers will work them out for us and thereby lessen Industry's heavy losses from soil corrosion to the extent that we afford them the opportunity and lend our sympathetic support!

Book Reviews

Principles and Practice of Flow Meter Engineering, Sixth Edition, By L. K. Spink 220 pp. 5½ x 8. Flexible cover. Published by Foxboro Co., Foxboro, Mass. Price $3.00.

This complete and informative handbook has been published since 1930 and revised at intervals since then. Its various sections cover Determination of Flow Rate, Orifice Plate Coefficients, Direct-Reading Liquid—Flow Meters, etc. Part 2, with complete data on gas flow measurement includes Coefficients, Chart Computations, Fundamentals of Commercial Measurement and Equations and tables for measurement. All data well indexed for user's convenience.

Fuels, Combustion and Furnaces, by John Griswold, 496 pages, 6½ x 9½, McGraw-Hill Book Company, 330 W. 42nd St., New York, N. Y. Price $5.50.

This textbook deals with the chemical engineering aspects of fuel technology. It deals with solid, liquid and gaseous fuels and their utilization, emphasizing the fundamental theoretical aspects.

An excellent engineering reference source. Although more space is given to treatment of gas and liquid fuel, solid fuel receives adequate though less detailed attention. A full list of references to sources is given. A list of motion pictures and film strips relating to the general subject of fuels is a valuable addition.

W. L. Melcher, A. O. Smith Corp. Now in Southern Post

William L. Melcher, Product Service Supervisor at the Milwaukee Headquarters of the A. O. Smith Corp., has been transferred to New Orleans where he will be in charge of the company's water heater and conversion burner sales in the states of Louisiana and Arkansas. This area is controlled by the company's district office at Houston, Texas.

Melcher joined A. O. Smith in 1943, after having engaged in public utility appliance sales work for a number of years in Illinois and Wisconsin.

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Training Britain's Future Gas Engineers

By

Col. W. R. Gordon, O.B.E.

Formerly Director of the British Coal Utilisation Council and
Commercial Manager for Low Temperature Carbonisation Ltd.

THE LARGEST gas undertaking in the world has resumed its prewar employee training program, but this time with a difference. Now, in addition to apprentices, there are reinstatement courses for a large proportion of the 8,000 returning ex-service men who left the company to join the British forces during the war.

Before describing the methods of training used it would be worth while outlining the extent of the activities of the Gas Light and Coke Company. Founded in 1812, the Company now serves an area of 546 square miles, right across the face of London north of the Thames. Its gas pipe lines extend no less than 6,300 miles. The normal gas make of 250 million cubic feet per day is carbonized in 13 works, using over 3 million tons of coal annually. About 20,000 men and women are employed, and 63 offices and showrooms serve a public, in the company's area, of at least 5 million people. The gas storage plant before the war held 160 million cubic feet but enemy action reduced this by one-third.

The Beckton gasworks at East Ham are the largest in Europe and are capable of producing half the total output. No less than 70 miles of full gauge railway line are needed to cover the works area.

In normal years the Company's coke output was 1½ million tons with a yield of 30 million gallons of tar. Refining is carried out at two chemical works, one at the eastern and the other at the western end of the Company's area. To serve its customers a very large fleet of trucks and railcars are maintained while the coal is largely brought to the works in the Company's own fleet of colliers.

For such an undertaking staff training, especially of fitters, foremen and district representatives is very important. Watson House, a former biscuit factory in the Fulham area, was adapted for this purpose and, in 1936, opened its doors as a training centre. During World War II it was taken over, together with its instructors, by the British Fleet Air Arm.

Our industry has put into effect many personnel training programs. It will be of interest to know how Britain's gas engineers are trained. In this article Colonel Gordon outlines the complete course.—Ed.

Recently it has resumed its pre-war role and large scale training is now, once again, in full swing.

Training Teachers

Rightly the Gas Light and Coke Company have paid great attention to the selection and training of instructors. They must not only know their subject thoroughly but also must be good at handling men and boys — especially the latter, when it comes to training apprentices. While the job of instructor inevitably has attractions, not every candidate is suitable. Each is only selected after a careful interview and then has to undergo a course in learning how to teach. This course, which lasts a fortnight, covers such subjects as methods of instruction, the technique of the blackboard and other visual aids, planning the lessons (both practical and theoretical), instruction by quizzes and the setting of tests and examinations.

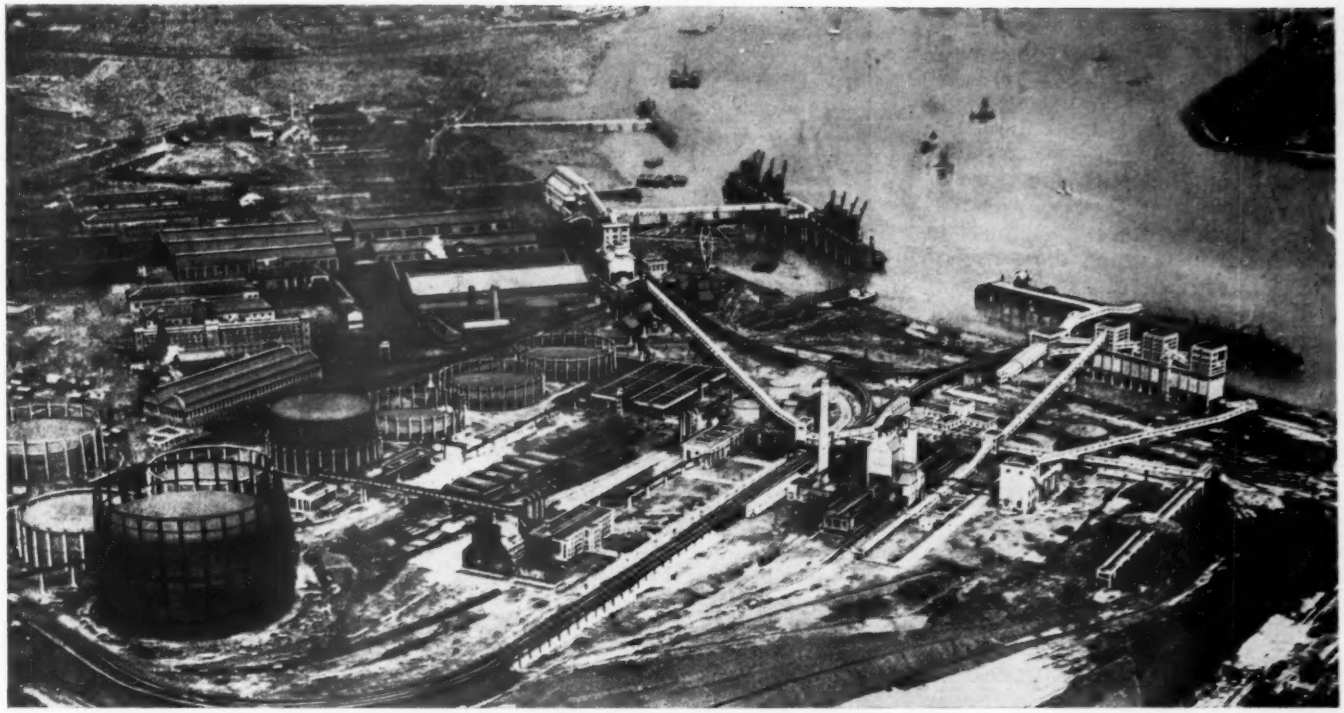
After the course, the instructors receive further help from the supervisory staff who visit the various classes undergoing instruction and make reports on the quality of the teaching. At first sight it might be thought that this practice would be resented by the instructors, but experience has shown that, on the contrary, they welcome such comments. In fact, inexperienced instructors, finding any difficulty in "putting across" a particular subject or lesson are prone to ask the supervisory staff to "sit in" and advise them how the instruction can be improved.

Modern Methods

As far as possible teaching by doing is preferred to teaching by merely hearing or seeing. Lectures are, consequently, cut to a minimum and no visitor could fail to be impressed with the extremely practical nature of the instruction. That is not to say that there are not many excellent, large, well lit and ventilated classrooms assisted by up to date visual aids. These are, in fact, in use and the Training Staff are hard put to it, at times, to find sufficient accommodation for all the trainees under their charge. The classrooms are, however, purposely, somewhat severe in character so as not to distract the pupil's eye from the subject matter of the lesson. Nevertheless, with the aid of models, epidiascope, lantern, sections and pictures the instruction is put across interestingly and effectively. There is even a touch of modernity about the blackboards, which are designed to swing and reveal a silvered screen for lantern projection on the reverse side.

The large, main instructional hall on the ground floor is, however, where all the practical teaching is carried out. There such subjects as chipping, cutting, filing and drilling to limits; the use of precision measuring instruments; hardening and tempering as well as pipe fitting (including joint wiping) and a host of other practical matters are taught to apprentice fitters. With each class, subdivided into groups of ten or twelve, for convenient supervision by an instructor, pupils can actually handle the tools, acquire confidence in them and do the jobs they will afterwards have to carry out in the customers' premises.

As yet it has not been possible in one respect to bring instruction methods back to pre-war standards. The Training Staff have long realized that there is all the difference between the doing of a job in a workshop with a concrete floor and doing it in Mrs. Smith's parlor. Before the war there used to be a set of model rooms, typical of customers' premises where repairs had to be car-



AERIAL VIEW OF PART OF BECKTON GAS WORKS

Beckton Gas Works—The largest in Europe. Capable of making 125 million cubic feet of gas per day this plant is on the river Thames on the way up to the port of London. The illustration shows the coke storage and grading plant in the concrete building on the right, with the coke loading pier beyond. The middle pier, with cranes, contains the coal unloading gear.

ried out without dirtying the carpet or pushing a pipe through a picture. These rooms suffered from the wartime occupation of the Centre and have not yet been repaired. It is the intention to do so, however, at an early date.

Reinstating Ex-servicemen

The courses, at present provided at Watson House, cover those for training the returning district personnel from amongst the 8,000 employees of the Gas Light and Coke Company who joined the forces during the war. Each demobilized man first returns to his pre-war work, as far as possible, until a vacancy occurs on the course most suitable to his needs. These classes last, with the exception of former apprentices, from 3 to 5 weeks. There are four graded classes for fitters and one for maintenance men. Each course is intended to bring the man up to the next grade—from C to B, and so on. After completing the course the ex-service candidate then sits for his examination in the Gas Fitters' Classification Scheme, under the auspices of the Joint Industrial Council for the British Gas Industry. Then, so to speak, the seal has been set on his trade rating and standing.

Instruction starts at 9 o'clock each weekday morning and lasts till 5 p.m., except on Saturdays when instruction ceases at noon. There is an hour given for lunch and two quarter hour breaks, one in the morning and one in the afternoon. The general syllabus covers installation and servicing of cookers, fires, wash-boilers, lamps and lighting burners in the lowest grade, C. Going up the grades other subjects such as the servicing of water heaters and refrigerators, joint wiping, catering equipment, central heating and industrial controls are added to the syllabus of the more advanced grades until the "refresher" course for Class A fitters is reached. Former apprentices receive an 8 weeks' course in all subjects, so as to bring them up to the necessary standard for taking the C classification test.

Also among the returning ex-servicemen are the various grades of district Staff Officer. These include the District Representatives who will each be in charge of some 2,000 gas meters and will have to look after all enquiries, complaints, estimates, etc., emanating from their territory. To some 2,000 customers, therefore, each will be the senior representative of the Company and their training is important.

Apart from technical instruction to bring these men up to date, talks are given about the work of the company during the war, the present day organization and future policy. Naturally much of their syllabus on the technical side deals with such theoretical considerations as design, cost, heating standards and comfort conditions in relation to different types of appliances.

So much for the training now being given by the Company to their staff returning from the war. The ex-service man gets full individual attention in resettlement while the Company, for their part, take their responsibilities in this direction very seriously.

Training Boys

But what about the young apprentices—those embryo fitters, foremen, district staff officers and higher officials of the future? They receive a thorough grounding in their trade, not only by a 2 year course at the Training Centre but also through supervised instruction for the last 3 years of their apprenticeship. During this post-training period they work under a different fitter each week. This plan ensures that the boy, who is good at joint wiping for example, shall not always be given the same job by his fitter-instructor, but shall get variety of work and thus gain all-round experience.

Before outlining the courses of instruction given to the apprentices there is, however, one present day handicap which affects recruitment of

lads for this trade and seems likely to affect other gas undertakings and industries too. There were, at the end of September 1946, only about half the number of apprentices undergoing instruction at Watson House, compared with the pre-war figure. One of the reasons is that many candidates were "ploughed" in their entrance tests on the score of illiteracy. This defect—serious as it is—can be traced to the difficulties of wartime education for the evacuee boy in Britain.

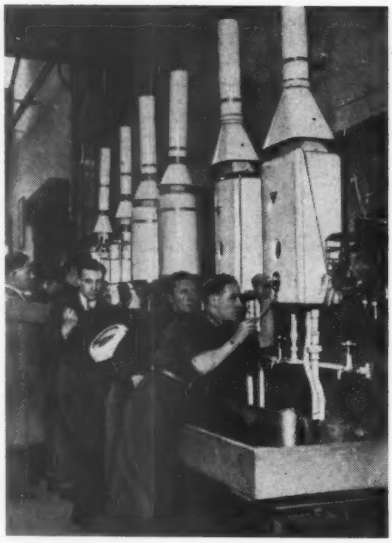
Two Separate Schemes

There are really two apprenticeship schemes run under the auspices of Watson House. The first is for gas fitters and the second for a miscellany of other skilled trades, sixteen in number. Included amongst them are such callings as electrician, blacksmith, plumber, sheet metal worker and bricklayer. Not all the courses for these sixteen trades are actually conducted at Watson House. Some of them, such as the iron-moulders, pattern makers and railway wagon repairers are taken at Beckton only. Others such as motor mechanics are conducted at the Motor Repair Shop at Brentford while turners, brassfinishers and industrial gas fitters are trained at the Industrial Appliances Workshop at Fulham.

Of course boys in Britain enter industry earlier than in America, but all candidates must be over the compulsory school age and should be intelligent, physically fit lads who show signs of possessing mechanical ability. They have to pass simple selection tests, to reveal their standards of general knowledge, intelligence and mechanical aptitude. Also they must produce a report from the headmaster of their school. On the physical side they have to pass a medical examination and, if necessary, be vaccinated. In considering the future flow of apprentice candidates for this, as for other British gas undertakings, it must be remarked that next year, when the compulsory school age in this country may be raised to 15, there will be a temporary but nevertheless drastic fall in numbers.

Five Years Study

Gas fitter apprentices complete their indentures on their 21st birthday. As the applicant must be over 14 and below 16 on the 30th of April of the year they enter, the period of apprenticeship may be 5 or 6 years. No premium is payable by the parents and the apprentices receive pay throughout their training period. In the case of the other skilled trades age of entry and length of apprenticeship vary.



Apprentices of the London Gas Light and Coke Company. Learning how to repair and adjust water heaters.

While in the training shops, apprentices work a 44 hour week but, in the last 3 years, they have a 47 hour week plus two or three evening classes per week, as may be necessary. Apart from the technical shop instruction all apprentices are released for one whole day each week, to attend a London County Council Technical Institute. Here they study English, engineering subjects, civics and physical training. During the whole shop training period—and at the Technical Institute too—the company subsidizes the cost of the mid-day meal which is supplied at an equivalent charge of only ten cents.

Practical Training

The training itself is divided into a first year course comprising 3 months instruction in general engineering including the handling of tools, 4 months on pipework, 1 month on internal installation practice, including meter fixing, and 4 months on the construction, installation and servicing of domestic gas appliances of all kinds. In the second year specialized work is undertaken, for definite periods, on mains and services, sheet metal work, advanced installations and servicing practices for a total of 5 months at the Training centre. The remainder of the year, apart from 6 weeks spent on carpentry and building construction, so far as they affect the gas fitter, is devoted to the construction, installation and servicing of industrial and commercial gas equipment.

During these first and second years the apprentice has to sit for and pass the Grades I and II examinations of the London City and Guilds Gas Fitting course. While working on a district during the 3rd and 4th years definite periods are set aside for the maintenance and installation of space heating appliances, cookers, water heaters as well as for training in handling defects and complaints. Each year there is a short refresher course and test held at Watson House, which thus, apart from periodic reports, keeps in touch with the trainee's progress.

In the third year apprentices attend evening classes and sit for the Final Grade of the City and Guilds Gas fitting examination. Those who do not pass must continue at evening classes until sucessful. Others, showing promise, are encouraged to take the British Institution of Gas Engineers Major Course in Gas Engineering Supply.

There is thus a channel by which the intelligent boy can qualify at his chosen trade and, if he shows ability, progress to responsible positions on the staff of the Gas Light and Coke Company, other gas undertakings or of heating engineers and contractors in Britain. It will be seen, therefore, that Watson House is not only performing a useful service to its own company and its employers but to the British Gas Industry as a whole.

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RECENT COURT DECISIONS *Affecting Gas Utilities*

Evolution of Gas Rates

By

Leo T. Parker

Attorney at Law
Cincinnati, Ohio

IN MANY respects, from a legal standpoint, gas corporations and common carriers are similar particularly when legality of rates are involved.

In fact the evolution of gas rates sprung from the old common law that regulated common carriers while these carriers still were utilizing horse drawn vehicles. And even today our state laws and higher court decisions do not distinctly differentiate details and entirely eliminate the wide spread rate confusion which sprung from the ancient common law.

Vast Difference

For example, a vast legal difference lies between overcharge and discrimination of gas rates. In fact even our modern courts have considerable difficulty in defining and determining these exact legal differences. In one higher court case, for illustration, decided in 1946, although the two lower courts held a gas company liable for payment of many thousand dollars to a gas consumer for "overcharge," the Supreme Court reversed the verdict and decided that the litigation involved discrimination, and not overcharge. Later in this article, we shall review this decision, in detail.

As previously stated the laws pertaining to gas corporations and common carriers are similar in many respects when overcharge or discrimination of rates are involved.

Therefore, we shall review briefly the history of the development of modern law relating to inequalities in rates and the measure of damages for discrimination in charges.

At common law a common carrier of merchandise was not under *any* obligation to treat all customers equally. He was bound to accept and transport merchandise for all, upon being paid a reasonable compensation. But the fact that he charged one customer less than for another was *only* evidence to show that a particular charge was unreasonable, and nothing more. There was nothing in the common law to hinder a carrier from transporting merchandise for favored individuals at an *unreasonably* low rate, or even gratis.

The rule of law was upheld by the English House of Lords in Directors, Great Western Ry. v. Wm. Richard Sutton, L. R. 4 H. L. 226, 237. This court said:

"At common law a person holding himself out as a common carrier of goods was not under any obligation to treat all customers equally. The obligation which the common law imposed upon him was to accept and carry all goods delivered to him for carriage according to his profession (unless he had some reasonable excuse for not doing so) on being paid a reasonable compensation for so doing."

On the other hand, the old law was well settled that if the carrier *refused* to accept merchandise for transportation, the shipper could recover damages based on the refusal. And, if the carrier charged a rate unreasonably high, *in consideration of rates charged other customers,* this overcharged customer could sue and recover from the carrier the surplus or overcharge. In other words, there was nothing in the old common law to hinder a carrier from serving for favored individuals at an unreasonably low rate, or even gratis. All that the law required was, that he should not charge any more than was reasonable. See the late case of Supreme Court v. Weld & Neville, 73 S. W. 529, 532, which upheld this law.

Other cases which uphold this law are as follows: Baxendale v. Eastern, 27 L.J.C.P. 137; Johnson v. Pensacola, 16 Fla. 623; Ex parte Benson & Company, 18 S. C. 38; and Cowden v. Pacific Coast S. S. Company, 94 Cal. 470.

Law Developed

The courts of the United States in undertaking to apply the old common law rule developed an exception thereto. This exception required *equality* in rates between competitors in business, whereas, as above shown, the old common law rule did not require equality at all, but only that no person should be charged more than a reasonable rate.

The American "exception" and modern development requires equality where the favored and disfavored parties are competitors in business, and our law allows a recovery for actual loss or damage, if any, that may be alleged and proved by the disfavored competitor. In each of the cases developing the American rule, the court had before it a complaint as to inequality of rates as between competing shippers or customers. The giving of preferential rates thus gave the favored party an advantage in trade, enabling him to undersell others or to increase his profits and thus ultimately destroy competition and create a monopoly in his particular field.

Therefore, it may safely be said that the tendency and weight of United States courts are in favor of the doctrine that a common carrier, and also other public utilities, is charged with the quasi-public duty of serving the public on equal terms, where the serving for some at a lower price than for others would injure those less favored. It is therefore not permissible for a public utility corporation to demand a different rate from different persons for an identical kind of service under identical conditions.

State Statutes

The various states have passed law prohibiting overcharge and discrimination of rates by public utility corporations. However, independently of the state statutes it is un-

lawful to discriminate in favor of or against any consumer. A majority of the United States cases hold that at common law a public utility cannot justly discriminate in rates between persons in the same circumstances. But the rule does not require that every consumer shall be charged exactly the same rates for gas or allowed the same facilities. It requires that the gas corporation shall not unreasonably or unjustly discriminate in favor of or against any consumer where the circumstances and conditions are the same.

Mere inequality in charges does not, therefore of itself amount to an unjust discrimination. It only becomes such when a discrimination is made in the rates charged for the same class of different users under the circumstances and conditions.

So a mere reduction from the established rate is not necessarily an unjust discrimination. But it becomes such when it is either intended or has a natural tendency to injure another consumer in his business and destroy his trade by giving to the favored consumer a practical monopoly of the business.

There are many cases showing the development of the American rule requiring competition between the parties before damages may be recovered for discrimination, among which are the following: Vincent v. Chicago, 1868, 49 Ill. 33; Messenger v. Pennsylvania, 1874, 37 N.J.L. 531; John Hays & Company v. Pennsylvania, C.C.N.D. Ohio 1882, 12 F. 309; Scofield Lake, 1885, 43 Ohio St. 571; Indianapolis v. Erwin, 8 N. E. 862; Menacho v. Ward, 27 F. 529; Bayles v. Kansas, 13 Colo. 181; Root v. Long Island, 114 N. Y. 300; Cook v. Chicago, 46 N. W. 1080.

Overcharge vs. Discrimination

At present although to a great degree laws and higher court decisions define positive rules for arriving at lawful rates charged for gas, yet the legal distinctions between overcharge and discrimination of gas rates still are obscure.

Broadly speaking, a discrimination may arise from a mere inequality in rates but an overcharge arises *only* when the rate charged is unreasonable in and of itself, irrespective of the rate exacted of others, or when it is in excess of the rates established for the particular customer or business. Therefore, in a suit for overcharges the rate paid by others is immaterial. It is only in suits for damages for discrimination that rates charged other consumers are important.

For example, see United Gas Corporation v. Shepperd Laundries Company, Inc., 189 S. W. (2d) 485, reported January, 1946. In this case the Shepperd Laundries Company sued the United Gas Corporation alleging that the gas company practiced discrimination by charging a higher rate for gas than charged other customers in the same city "under similar and like circumstances."

In this suit the laundry company proved that the gas company supplied gas to it at 19 cents per 1000 cubic feet for the first 1000 per month, 18 cents for the next 9000 cubic feet, and 17 cents for all additional gas used during the month, while during the same period gas was furnished to other customers similarly situated at lower rates. In other words, the laundry company sued for the difference between the rate it paid and the lower rate paid by other similar customers. The jury decided that the favored customers were served under similar and like circumstances and upon undisputed facts that they did receive gas at lower rates, a judgment was rendered for the laundry company in the sum of $5,094.10, which was affirmed by the court of civil appeals.

The gas company appealed to the higher court on the contention that the laundry company was not entitled to a favorable verdict because it did not claim that the rate charged was unreasonable or that the lower rate given to other customers caused the laundry company any loss or damage in its business. Thus the gas company argued that this is merely a case of "discrimination in rates," *not* involving an overcharge, and that the measure of damages in such instances of discrimination is *not* the difference in the two rates but the actual loss by the laundry company suffered as a result of the lower rates to others.

When deciding this question the higher court explained that the laundry company did not assert that it paid an unreasonable rate or that the lower rate charged other customers had been established by the gas company or any rate-making body. In other words, the laundry company's claim was *not* that it had paid *more* than was due the gas company under an established and legal rate, but simply that other consumers paid less, and that this mere inequality in rates subjected the laundry company to a discrimination, in violation of article 1438.

It was alleged by the laundry company that during part of the time it was paying the 19-18-17 cents rate such customers in Houston as Public Laundries, Ineeda Laundry, Port City Packing Company, Fehr Baking Company and St. Joseph's Infirmary, *in the same classification* and under *similar* situations, were furnished gas at 14-13-12 cents and that at other times various industrial firms were being furnished gas at 16 cents for the first 1000 cubic feet and 15 cents for all additional gas.

Particularly, the laundry company did not allege that it had suffered a loss equal to the difference between what it had paid under the higher rates, and what it should have paid under the lower rates.

During the trial testimony was given that in 1925 the city council fixed $1.05 per 1000 cubit feet as the maximum rate at which all gas might be sold in the city. By subsequent ordinances the rates for residential and commercial consumers were successively reduced, but no ordinance was ever passed reducing the maximum rate of $1.05 for *industrial* customers. It left lesser rates for such users to be fixed by the gas company.

Further testimony showed that all industrial customers were served under written-term contracts in which there were embodied the rates which had been established by the gas company for the class of business to which the customer belonged. A total of 64 industrial customers, including all laundries, were served at the 19-18-17 cents rate. In fixing these rates the following factors were considered: (a) Load factors; (b) volume consumed on an annual basis; (c) value of service to customer; and (d) competition between gas and other fuels as well as competition between customers for whom the rate is designed.

It was in keeping with these factors that the lower rate of 16-15 cents was extended to other industrial firms.

Because the two lower courts decided that the gas company was liable to the laundry company for several thousand dollars *overcharge* the higher court reversed the verdict and decided that the matter of "overcharge" was not at all involved in the the controversy. This higher court said:

"It is therefore evident that respondent's (laundry company's) suit is not for overcharge but for discrimination where competition between rate payers is a factor and damages must be alleged and proved. However, respondent (laundry company) seems to ignore these fundamentals and bases its suit solely upon the theory that it should be entitled to recover simply because it paid a certain rate and others paid less. . . . Overcharge and discrimination have

very different consequences, and must be kept distinct in thought. When the rate is excessive or unreasonable in and of itself, irrespective of the rate exacted of competitors, there may be recovery of the overcharge without other evidence of loss."

Also, see the opinion of Justice Cardozo of the United States Supreme Court in Interstate Commerce Commission v. United States, 289 U. S. 385. This court said:

"When discrimination and that alone is the gist of the offense, the difference between one rate and another is not the measure of the damages suffered by the shipper."

Other leading higher court decisions involving distinctions between overcharge and discrimination are, as follows: International Company, 230 U. S. 184; Mitchell v. Pennsylvania Company, 230 U. S. 247, 258; Keough v. Chicago, 260 U. S. 156; Postal Company v. Associated, 228 N. Y. 370.

Also, see Southern, 245 U. S. 534, where the United States Supreme Court held that a different measure of recovery is applicable where a party that has paid only the reasonsable rate sues upon a discrimination because some other has paid less. This party can recover the damages that he has suffered which may be more than the preference or variations in rates or less, but whether more or less, is something to be proved and not presumed.

In other words, under no circumstances may a gas consumer recover anything from a gas company unless he proves that as a result of the company's acts, damages in some amount susceptible in figures resulted. The question therefore is not how much better off the consumer would be today if it had paid a lower rate. The question is how much worse off it is because others have paid less.

Measure of Damages

In an early decision the Supreme Court of the United States in Pennsylvania, 230 U. S. 184, discussed and defined the correct measure of damages, as follows:

"Having paid only the lawful rate, plaintiff was not overcharged. . . . The measure of damages was the pecuniary loss inflicted on the plaintiff as the result of the rebate paid. Those damages might be the same as the rebate, or less than the rebate, or many times greater than the rebate; but unless they were proved, they could not be recovered."

And, again see Kousal v. Texas Power & Light Company, 179 S. W. (2d) 283. In that case there was an undercharge, rather than an overcharge, from the established rate. The consumer who was the disfavored party sued for the difference in the rates charged it and the lowest rates charged other customers. This court held that to approve such an arbitrary measure of damages "would create a legalized but endless chain of departures" from the fixed rate. It was further said:

"Therefore, we are constrained to hold that, although the case made by the Kousals (consumer) does show unlawful discrimination and preference by the utility of other similarly situated customers . . . they failed to establish a cause of action for overcharge."

SOUTHERN GAS ASSN. COMMITTEE CHAIRMEN PLAN PROGRAM AND SELECT COMMITTEE MEMBERS AT MAY 16th DALLAS MEETING Seated left to right—Allen Burns, Arkansas Louisiana Gas Co., Industrial and Commercial; D. W. Reeves, Oklahoma Natural Gas Co., Sales; Winnell Simmons, Houston Natural Gas Corporation, Home Service; W. L. Woodward, Zenith Gas System, Inc., President; W. H. Ligon, Nashville Gas and Heating Co., Membership; Dean A. Strickland, United Gas Corporation, Immediate Past President. Standing, left to right—Fred D. Bradley, Southern Union Gas Company, Convention; Carl E. Cloud, Oklahoma Natural Gas Co., Transmission; H. K. Griffin, Mississippi Gas Co., Operating; J. Frank Scott, Southern Natural Gas Co., Accident Prevention; E. T. Anderson, Atlanta Gas Light Co., Accounting.

CRUSE-KEMPER COMPANY
AMBLER, PENNA.
GAS HOLDERS
Low Pressure High Pressure Inspection
Purifiers Tanks Flues
Over 40 Years of Sound
Steel Plate Construction

New Equipment

High Pressure Gas Mixer

A venturi mixer for high pressure gases, incorporating improved mechanical design features, is announced by the Industrial Division, Bryant Heater Company, Cleveland, Ohio.

Known as the "Hijector", the new unit uses gas under pressures up to 35 pounds to entrain all the air needed for combustion, and to deliver the mixture to burners at the highest possible pressure.

Bryant "Hijector"

Overall length of the unit is substantially reduced over conventional designs, by rearrangement of the elements for ease of servicing.

By reversing the usual operation of the air shutter and locating it on the body, the orificce spud is accessible for removal without disconnecting any piping.

Air entrainment noise is reduced, while the orifice and air entrainment areas are readily accessible for inspection or cleaning. The shutter, though backed entirely out of the way, cannot be disassociated from the mixer and become lost.

Available in pipe sizes from ¾" to 4", the Hijector is suitable for use with all types of gases, including liquefied petroleum types.

An integral cast mounting boss, with drilled and tapped holes, simplifies mounting of auxiliary devices.

Hijector specifications and capacity tables for gases ranging from 500 to 2,500 btu. are included in Data Sheet 5B-1, available on request to the company.

Air Velocity Instrument

Hastings Instrument Company is introducing an ultra-sensitive air velocity meter which will measure air velocities as low as five feet per minute. The Air Meter is applicable to the measurement of velocities in ducts, the measurement of wind velocities, the measurement of flow in air and gas lines, and surveys of heating and air conditioning systems. The principle of operation is based on a combination of the hot-wire and thermopile principles.

Operates from 110 volts AC power. May be adapted for remote indication of velocity.

Velocity Meter

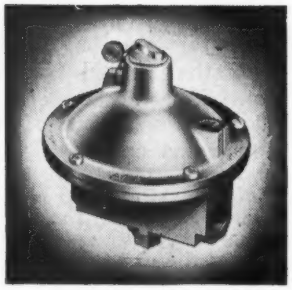
Standard range is from 0 to 2000 feet per minute. Fifty feet per minute is approximately 20% of full scale. Velocities as low as a foot per minute can be measured.

Further information from Hastings Instrument Company, Inc., Hampton, Virginia.

Appliance Regulator

The Thermac HM Appliance Regulator designed for use with natural gas, manufactured gas and Butane-air is constructed of aluminum alloy for light weight and strength. Bosses around the pipe connections and body to cover flanges are extra heavy to withstand more than ordinary abuse. Internally, it is rugged in design with parts of corrosion resistant materials.

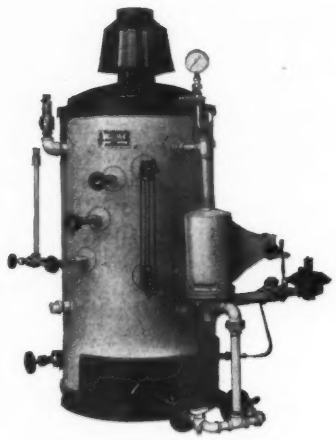
Built in sizes ranging from ⅜" to 2½" IPS, they are so designed that they may be inspected without removal from the line. Certified by A.G.A., each regulator is individually tested and sealed to the appliance builders specifications. Illustrated bulletin available from Thermac Company, 802 East 108th Street, Los Angeles, 2, Calif.



Thermac Regulator

Lattner Flueless Boiler

Illustration shows the 2 H.P. Jacket Type Lattner boiler equipped with combination gas control and low water gas cut-off. This type is available in four sizes from 1 to 3 H.P.



Jacket Type Boiler

Designed for 100 lbs. maximum steam operating pressure under A.S.M.E. code. U-shaped heat conductors, instead of the conventional flues, intercept and baffle the heat travel from the burner. Flue gases pass over the top of the shell and to the stack.

Water leg type also available for 5 to 18 H.P.

Made by P. M. Lattner Mfg. Co., Cedar Rapids, Iowa. Bulletins on request.

and Appliances

Republic Duo-Way

The Autogas Company of Chicago has just released its household waste disposal unit—the Duo-Way. Nine years of engineering and testing have gone into this equipment.

It is designed with two compartments in a single rotating hopper. In operation, the refuse is deposited in the drying compartment through the charging door, located in the top. This charge is permitted to dry for 12 to 24 hours, after which the hopper is rotated. This rotation places an empty compartment under the charging door and moves the dried charge into the burning zone. Push button ignition applies a momentary gas flame which ignites the dried refuse so that it may burn completely.

Duo-Way Disposal Unit

A small gas flame (1500 B.T.U. per hour) burns continuously under the drying chamber. This flame heats the air which is drawn through the waste materials by the flue action. Holes are provided in the bottom of the drying compartment to permit easy passage of the heated air into this compartment.

A diffuser plate is set above the flame to diffuse the products of combustion, keeping the temperature of the heated air below the kindling point of the waste materials. This plate also prevents the ash from plugging the ports of the burner.

Turning of the hopper automatically sweeps the ashes into the ash drawer which under normal usage, will have to be emptied about once a month.

This unit simplifies the problem of refuse disposal in that it disposes of the refuse daily and thus avoids accumulations.

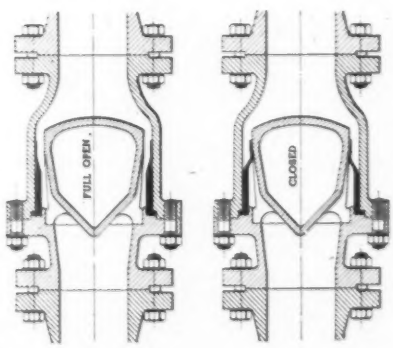
It dries the material thoroughly at a low temperature without flame coming into contact with the waste materials and thus there is no objectionable odor. No chamber cleaning nor grate shaking necessary. May be installed in two to three hours.

Flue connection is 5" dia., gas feed line should be ½". Usually located in basement. Over-all measurements are as follows: height, 37"—diameter, 24"

Improved Check Valve

The new design of Grove "Chex-flo" valves contributes to improved operating characteristics. Embodying no metallic operating parts, this valve operates on low pressure differential. Available in sizes ranging from ½" to 12".

One of the outstanding features is its tough flexible tubular operating member, comprised of a thick load section, tapering down to a sensitive operating lip, which requires no differential pressure to effect positive bubble-tight shut-off.



This tapered synthetic rubber lip freely expands to open, permitting unrestricted streamline flow. Due to its resilient elasticity it smoothly contracts to close on slack flow—prior to the start of back flow. The degree to which it opens or closes is in direct ratio to flow volume. In the open and closed position it is fully supported against extreme pressure or intensive impulse shocks by the inner walls of the valve body, and the cylindrical acorn-shaped core which it tightly encompasses. As it reaches shut-off position, flow velocity increases to flush the seating surface of any small particles. The resiliency of the flexible tube absorbs any shock impulses.

Made by Grove Regulator Co., 65th and Hollis Streets, Oakland, California.

New Motorized Valve

A new, compact motorized valve is made by Automatic Temperature Control Company, Philadelphia 44, Pa.

Motor-Actuated Valve

The new unit is especially adaptable for commercial machinery and equipment; heating and air conditioning systems; heating and cooling coils, etc. It provides automatic two-position (on-off) operation of valves for steam, air, gas, oil or water. A rugged induction type motor develops a positive power-drive through a worm and spur gear reduction. Limit switches are adjustable and are designed for trouble-free service. A sturdy cast iron housing is dust-tight and splash-proof; all parts are easily accessible.

Requires a 3-wire thermostat, pressure switch or other similar instrument for actuation. Operates from either 24, 110 or 220 Volts, A. C. power source.

Twenty-Second Annual Southwestern Gas Measurement Short Course

"We had acres of space for the Southwestern Gas Measurement Short Course" was the remark made by one person who attended the annual event this year. That was literally true since the Navy permitted the use of the large drill hall and the spacious adjacent parking area as a place to house the Short Course and take care of the parking problems of those attending. The Navy Drill Hall which is located one mile north of Norman at the Navy Air Station proved to be an ideal place for the Short Course. The main area of this 300 foot long building was used for an auditorium which seated 800 persons, two classrooms, and ample space for all of the twenty-one companies which had educational exhibits. The large locker rooms which were located just off the main drill hall were converted to classrooms with some seating as high as one hundred persons. The drill hall is so large that three classes were held simultaneously during the afternoon periods and there were no sound effect interferences.

The Registration Committee of which Miss Kate A. Niblack (Oklahoma Utilities Association, Oklahoma City) is Chairman, had ten girls on duty and six hundred students of the Short Course were registered during a one-hour period. The registrants attending the Short Course represented twenty-six states, Old Mexico and Venezuela.

The General Assembly of the first morning was opened by Mr. R. M. Scofield of the Lone Star Gas Company of Dallas, Texas, who is General Chairman. Mr. Scofield introduced Dean W. H. Carson of the College of Engineering, University of Oklahoma, who in turn introduced President G. L. Cross of the University. Dr. Cross gave the address of welcome. Following Dr. Cross' talk, Dean W. H. Carson outlined to the students assembled the aims and purpose of the Short Course. Mr. D. A. Hulcy, President of the Lone Star Gas Company delivered the principal address for the morning with an inspirational talk on "Development of the Natural Gas Industry." The afternoon session was devoted to classroom work with a wide variety of subjects being covered. Fundamental subjects relating to gas measurement regulation and controls were the topics of discussion during the Wednesday and Thursday morning sessions.

To Mr. George Greiner, Phillips Petroleum Company, Chairman of the Exhibits Committee and the exhibitors go the credit for the excellent educational exhibits which were open to those attending the Short Course.

Mr. E. C. McAninch, Oklahoma Natural Gas Company, Ardmore, Oklahoma, was Chairman of the Program Committee. During the meeting of the General Committee on Tuesday evening, May 6, Mr. McAninch was elected Chairman of the General Committee for the 1948 Short Course. Other members elected to office were: Local Arrangements, W. H. Carson, Dean, College of Engineering, University of Oklahoma; Program, C. E. Terrell, Southern Natural Gas Company, Birmingham, Alabama; Registration and Publicity, Miss Kate A. Niblack, Oklahoma Utilities Association, Oklahoma City; Practical Methods, James L. Griffin, Northern Natural Gas Company, Omaha, Nebraska, Vice Chairman, Practical Methods, George E. Greiner, Phillips Petroleum Company, Bartlesville, Oklahoma; Publications, B. F. Worley, United Gas Corporation, Houston, Texas; and Exhibits, T. S. Whitis, Amarillo Oil Company, Amarillo, Texas.

The dates of the 1948 Southwestern Gas Measurement Short Course were set for April 13, 14 and 15.

Mr. W. H. Woods, Gulf Oil Corporation, Houston, Texas, Chairman of the 1947 Publications Committee announced that the Proceedings would be published in bulletin form and a complimentary copy will be sent to each person who attended the Short Course this year. A sales copy may be secured for $3.50 by writing to Dean W. H. Carson, College of Engineering, University of Oklahoma. Only a limited number of bulletins will be published.

The cash prizes for those submitting papers on "What I learned during the 1946 Southwestern Gas Measurement Short Course" were awarded to:

First Prize: Roy A. Eaton, Continental Oil Company, Box 96, Basile, Louisiana.

Second Prize: R. M. VanHorn, Lone Star Gas Company, 1915 Wood, Dallas, Texas.

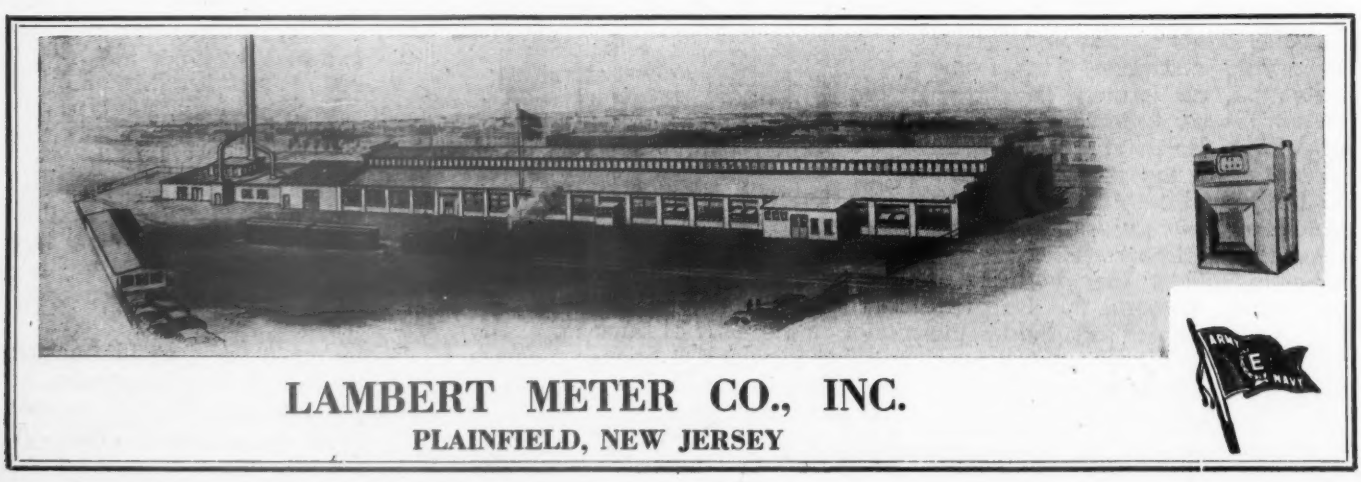
Third Prizes: Homer Miesse, The Central West Utility Company, Bonner Springs, Kansas.

Charles G. Hurst, Arkansas Louisiana Gas Company, Little Rock, Arkansas.

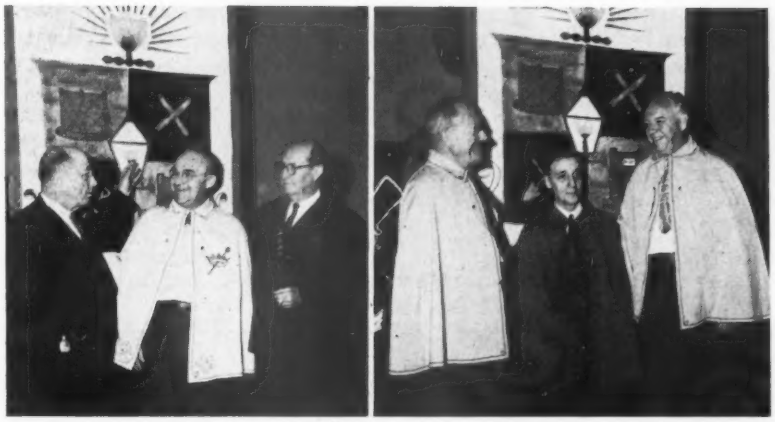
C. O. Walling, Jr., Gulf Oil Corporation, Crane, Texas.

J. M. Brown, Lone Star Gas Company, Abilene, Texas.

Mrs. R. E. VanCleave, Cotton Valley Operators Committee, Cotton Valley, Louisiana.



Gild of Ancient Supplers Holds Tenth Annual Dinner



Left: In center, Mayor Mulcare flanked by Past Mayors C. Edwin Bartlett (left) and William S. Guitteau

On the right:—Alderman Joseph A. Messenger; Keeper of the Treasure, Glenn H. Niles and Alderman E. Carl Sorby

CELEBRATING the 10th anniversary of the founding of the Gild of Ancient Supplers, two score members gathered for a birthday dinner at the Meridian Club, Philadelphia, Pa., May 9th. The Gild was born May 5, 1937, when a dozen founders met at Skytop Lodge during a convention of the Pennsylvania Gas Association. Gild membership now numbers 210 and includes only men who for 10 years or more have been furnishing equipment, materials, supplies, appliances, and professional skills to the gas utility companies of the country.

Presiding officer at the 10th birthday dinner was the regional Warden, W. Roberts Cameron of Philadelphia. Brief speeches on Gild history and ideals were made by: Mayor Joe A. Mulcare, New York; Keeper of the Treasure Glenn H. Niles, Ridgewood, N. J.; Alderman E. Carl Sorby, Rockford, Ill.; First Past Mayor William S. Guitteau, Fort Lauderdale, Fla.; and Second Past Mayor C. Edwin Bartlett, Philadelphia.

Guest of honor was Jacob B. Jones, superintendent of the Bridgeton (N. J.) Gas Light Co., who represented the "Gas House Terriers." Mr. Jones will celebrate next April 1 his 50th year as an operating gas man.

The dinner was arranged by Master of Revels Joseph A. Messenger, New York. Others present were: Regional Wardens George P. Velte of Boston, J. Albin Johnson of Long Island City, and David S. Sharpe of Atlanta; Honorary Member Alexander Forward, former managing director of the American Gas Association; and the following Supplers:

John F. Mooney, Orlando, Fla.; Homer Dufault, Springfield, Mass.; Benjamin L. Landis, Chambersburg, Pa.; and Herbert C. Erhard, Baltimore.

From New York—James I. Gorton, Wilson J. Kite, Jr., S. G. Krake, William H. Parish, George H. Smith, Harold W. Springborn and H. Leigh Whitelaw.

From Philadelphia—Thomas H. Clark, John L. Eigenbrot, William J. Foster, Carl A. Goodwin, William G. Hamilton, Jr., L. Minford Humrichouse, John B. Klumpp, R. W. McClenahan, E. W. Mears, Leslie E. Moxon, Carl A. Schlegel, J. Mortimer Traugott, Sol W. Weill, Edward B. Wilson, Duncan A. Worrell, and John B. Wynne.

L. to R.—Wardens W. R. Cameron, J. Albin Johnson, George P. Velte and David S. Sharpe
Below:—Supplers John L. Eigenbrot and L. M. Humrichouse

12th Annual Convention-Florida-Georgia Gas Meters Association

THE Florida-Georgia Gas Meters Association installed H. P. Thomas, vice president of Peoples Water & Gas Company, Miami Beach, Florida, as president at the close of its 12th annual convention. There were approximately 200 registered for this convention, held at the Boca Raton Club, Boca Raton, Florida, on April 25 and 26.

The retiring president, Buell G. Duncan, vice president of South Atlantic Gas Company, Orlando, Florida, automatically becomes vice president, while J. W. Owen, general manager of Central Florida Gas Corporation, Winter Haven, Florida, was re-elected to serve as secretary-treasurer of the association.

Newly-elected directors are Ted Bergman of Florida Power & Light Company in Miami, A. H. Stack of Tampa Gas Company, I. J. Wynn of Gainesville (Fla.) Gas Company, Harold Duguid of Jacksonville Gas Corporation, and Frank K. Toney of Combustion Engineering Company, Charlotte, N. C. Other directors include Francis Middleton of Clearwater (Fla.) Gas Department, John L. Arnold of Albany (Ga.) Gas Department, C. J. Noda of St. Augustine Gas Company, E. M. Fondersmith of L. J. Mueller Furnace Company of St. Petersburg, Fla., and R. G. Taber, Atlanta Gas Light Co., Atlanta, Ga.

Carlyle W. Sweet, general sales manager of Peoples Water & Gas Company, Miami Beach, Florida, was General Convention Chairman and also chairman of the Sales Section, while John L. Arnold of Albany (Ga.) Gas Department, served as chairman of the Technical Section.

The welcoming address was made by J. Sherwood Foley, president of the Florida Hotel Association. Following the annual report of the president, Buell G. Duncan, Mr. Sweet introduced the opening speaker of the general session.

Lloyd C. Ginn, sales promotion and advertising manager, American Stove Company, and chairman of the Domestic Range Division of G.A.M.A., spoke on "Selling Tomorrow's Customers Today." Mr. Ginn discussed the sales promotional efforts being made to reach the home economics departments of high schools, colleges and universities. He emphasized the importance of immediate replacement of out-moded gas ranges now in schools and colleges with modern automatic gas ranges, pointing out that this would provide the best assurance that the generation rapidly coming of age would be well informed as to the modernity and desirability of gas cookery.

The new certification program soon to be launched was described by H. Vinton Potter, New Freedom Gas Kitchen director for A.G.A. By means of this kitchen certification program, architects and home builders and building contractors can gain prestige through sales of a modern kitchen that is certified as to its efficiency, beauty and modernity. Mr. Potter outlined the progress that has been made in promoting the New Freedom Gas Kitchen, and concluded his presentation with a showing of the new Kodachrome sound-slide film, "The Flame of Freedom," which is now available for showing before consumer groups, civic and other organizations, gas company personnel and dealers and their employees.

At the mid-day luncheon, Mr. Steve Willis of Radio Station WJNO, West Palm Beach, Florida, gave an interesting talk on the value of increased enthusiasm on the part of the industry, and pointed out the many benefits accruing to the gas company through active participation in civic and other local community activities.

E. Carl Sorby, vice president, George D. Roper Corporation, opened the afternoon session with a dramatic talk, "Crumbs from the Table." Mr. Sorby emphasized the demand for modernity in gas cooking appliances, and pointed out that the modern gas range, built to CP specifications, admirably fills this demand. He traced the recent growth of the modern gas range in showing how it is keeping pace with current consumer demands for modernity and convenience.

In the unusual presentation, "Magic of Fire," H. F. Browne and Max S. Peterson, of the U. S. Bureau of Mines, demonstrated in striking fashion the properties, characteristics and hazards of fire and fuels. By demonstration, they showed how to prevent fires and explosions, and how to subdue them if they should get out of control.

The various sections held breakfast meetings Saturday morning, with round-table discussions led by the following: Sales Section—W. M. Sutton, South Atlantic Gas Company, Orlando; Manufacturers Section—Ted Bergman, Florida Power & Light Company, Miami; Technical Section—John L. Arnold, Albany Gas Department; Accounting Section—J. K Roberts, Florida Public Utilities, West Palm Beach. Following the breakfast meetings, the program was divided into two sections, Sales and Technical, with Carlyle Sweet as chairman of the Sales Section and John Arnold as chairman of the Technical Section.

R. J. Canniff, sales promotion and advertising manager, Servel Inc., Evansville, Indiana, opened the sales section program with a discussion of the All Gas Kitchen. Mr. Canniff reviewed the progress made thus far in connection with kitchen planning and the all-gas kitchen, and outlined Servel's future sales promotional plans in this field.

Servel's new "Twin Six" was introduced by A. M. Wickman, sales manager of Servel's household refrigeration division, as the answer to the present demand for a large 12 foot refrigerator for commercial and large residential installations. Mr. Wickman pointed out the many advantages inherent in this model, both from the dealers' viewpoint and from the users' angle.

George S. Jones, Jr., vice president of Servel Inc., gave an address entitled "The Philosophy of Sales." In his talk, Mr. Jones emphasized the many advantages of selling as a profession, and urged careful selection of salesmen and a thorough training program in order to insure their success.

The advertising plans of the American Gas Association, both for the immediate future and from a long-range standpoint, were presented by Charles W. Person, Director of Advertising for AGA in an illustrated talk entitled, "Spotlight on the Blue Flame."

In the Technical Section, Warren C. Meyer of Stacy Dresser Engineering Company, gave a very informative talk on the proper handling and storing of liquid propane. An inter-

esting explanation of the "Vegetation Survey Method" was given by James Chaisson Jr. of Southern Cross Forresters, Atlanta, and N. R. Jones of Compania Subana de Electridad, Havana, spoke on the "Modified Screen Grid Process of Gas Manufacture."

T. M. Gilbert, Cutler-Hammer Inc., New York, spoke on the Importance of Recording Calorimeters and Thermeters, and Joe Frink of Florida Power & Light Company, Miami, concluded the Technical Section meeting with a talk on "Cathodic Protection of Underground Systems."

At the midday luncheon, H. Leigh Whitelaw, Managing Director of G.A.M.A. gave an interesting and enlightening report on the present condition of the steel industry and prospects of supplying steel for pipe and appliance manufacture.

The convention closed with a banquet at which the newly elected officers were installed.

AT THE FLORIDA-GEORGIA GAS METERS ASSOCIATION CONVENTION.

(1) Mrs. H. P. Thomas; H. P. (Pat) Thomas (new president, Fla-Ga Gas Meters Assn) v-p, Peoples Water & Gas Co., Miami Beach, Fla; B. G. Duncan (retiring president, Fla-Ga Gas Meters Assn.) v-p, South Atlantic Gas Co., Orlando, Fla.; Mrs. B. G. Duncan.

(2) George S. Jones Jr., vice president, Servel Inc., Evansville, Ind.; A Southern Belle; Robert J. Canniff, sales promotion and advertising mgr., Servel Inc.. Evansville, Ind.

(3) Ted Bergman, superintendent, Gas Department Florida Power & Light Company, Miami, Fla.; W. S. Guitteau, American Meter Co., Orlando, Fla.

(4) L to R: William H. Keefe, gas commercial department, Florida Power & Light Co., Miami; Mrs. Grace Mulcare, Mulcare Engineering Co., Inc., New York, N. Y.; Paul R. Greenaway (Editor, Fla-Ga Gas Meters Assn's "Meter", sales promotion, Florida Power & Light Co., Miami.

Complete Roper Line Ready for Retailers

Ushering in the post-war 1947 plan of activity for the Geo. D. Roper Corporation of Rockford, Illinois, Vice President E. Carl Sorby announced today that the complete Roper selling package and complete line of merchandise is ready for Roper retailers.

At a recent sales meeting held in Rockford, Advertising Manager Cy Edwards, under whose direction the plan was developed, gave a preview of the complete program to the Roper national selling staff.

Neglecting no phase of the merchandising and advertising picture, the Roper plan includes direct mail, national advertising, trade advertising, newspaper ads, display material, sales visualizers, product catalogs, special announcements, pieces for dealer distribution, a Sales Facilities unit and sales and service training books.

Jackson Appointed Sales Manager of Coroaire Co. and Hot Boy

Mr. A. W. Conley, President of The Coroaire Heater Corporation and subsidiary, Hot Boy, Inc., announced the appointment of Edward D. Jackson as Sales Manager for both companies.

He will direct the national sales of the Coroaire line of gas-fired heating and winter air-conditioning units, and Hot Boy space heaters through 300 distributors and jobbers and 20,000 dealers.

Expansion Plans of Gas Utility Companies Are Nation-Wide

The gas utility companies are prepared to spend approximately one billion dollars this year in expanding production, transmission and distribution capacity. Shortages of materials, principally steel, pipe and tin plate, overburdening of the nation's transportation system and delays in obtaining necessary certifications to expand the country's natural gas pipe line systems are seriously obstructing these expansion plans.

Expansion programs are now going forward as rapidly as materials become available. For example, The Brooklyn Union Gas Company, as part of a $24,000,000 program has installed two new water gas sets and has three additional water gas sets and a propane air plant under construction. Two new waterless holders will provide storage for meeting peak load demands.

Boston Consolidated Gas Company now has under construction two carburetted water gas sets and will install a third set. Its plans include a liquefied petroleum plant and 28 liquefied petroleum storage tanks for standby use. Consolidated Gas Electric Light and Power Company of Baltimore increased manufacturing capacity 8 million cubic feet per day last year and plans an expansion of like amount this year. It now has a 5 million cubic foot gas holder under construction and plans to install an additional holder, two water gas sets, and other production accessories to cost $5,400,000. Additional gas distribution facilities planned will cost $8,000,000 over a three year period.

The Ohio Fuel Gas Company hopes to spend $5,00,000 in improving its distribution system in 1947 and will spend $10,000,000 for additional transmission lines and greater storage capacity. Materials have been ordered for 100 miles of new transmission lines. More than 7 billion cubic feet of storage space will be added to present facilities and construction has been started on two propane-air plants.

The Portland (Oregon) Gas & Coke Company spent $1,750,000 last year for additional generating, gas main, compressor and liquefied petroleum capacity. More than $3,250,000 will be spent this year. The South Carolina Power Company has added a new gas plant at Charleston to pipe a mixture of propane gas into the city's carburetted water gas supply to meet peak load demands.

Additional water gas sets are being installed by the New Haven Gas Light Company and Hartford Gas Company, each spending $2,000,000 for expansion in 1947. The Bridgeport Gas Light Company is to spend $1,500,000 for additional equipment. Long Island Lighting Company has on order water gas sets, compressors and storage holders for installation this year.

Natural gas pipeline facilities are expanding as rapidly as available materials and regulatory situations permit. Addition of the $143,000,000 Big and Little Inch lines to the nation's network augments natural gas supplies in the eastern area. The Tennessee Gas & Transmission Company is planning a 1,000 mile, $55,000,000 gas line from the Houston area to West Virginia. El Paso Natural Gas Company, Southern California Gas Company and Southern Counties Gas Company are constructing a $70,000,000, 1280 mile 30 inch line from Texas to California.

Michigan Consolidated Gas Company and its subsidiaries will spend more than $1,500,000 this year in gas field facilities, preparatory to construction of the $52,000,000 Michigan-Wisconsin Pipe Line. Houston Natural Gas Corporation is carrying on an accelerated expansion program and the gas company affiliates of the Amarillo Oil Company are adding compression facilities and building additional loop-lines, including a new 16 inch pipe line. The Penn-York Natural Gas Corporation and Dominion Natural Gas Company, Ltd., plan to lay 122 miles of 10 inch high pressure main to bring gas from the Appalachian areas.

These are a few of the hundreds of expansion plans of the gas industry. Natural gas reserves are more than adequate. The last report of the Natural Gas Reserves Committee of the A.G.A. placed recoverable reserves of natural gas at 160 trillion cubic feet, a gain of 12 trillion cubic feet over the previous year, against national consumption of about 4.9 trillion cubic feet.

Reports indicate some improvement in the steel situation. Sheet and strip production facilities were increased from 16 million tons to 19 million tons annually during the war, but labor troubles and stoppages reduced production to about 14 million tons in 1946. Maximum production is hoped for this year, but many industries are clamoring for this production.

Because of the difficulties in obtaining supplies and materials restrictions on new gas services became necessary in some areas for the protection of existing gas customers. As the materials situation improves these restrictions will progressively be lifted.

First Year of Natural Gas in Wisconsin

On May 21st a dinner was given at Lake Geneva, Wis. in honor of the first full year of natural gas service for that area. The pipe line runs up from Illinois from the south, this having been a sort of trial installation for that area, to get into Wisconsin. No natural gas lines were permitted in that state until the federal authorities took over the matter of pipe lines crossing state lines.

The talks at the anniversary dinner were all in favor of natural gas. "Rates are to be reduced substantially due to the increase in consumption of natural gas in the past year and further increases in prospect," the speaker, Kenneth D. Knobloch, president of the local company, the Wisconsin Southern Gas Company, advised his audience. Additional pipe lines would be constructed in Wisconsin now, Knobloch said, except for the shortage of pipe for that purpose. It might be two or three years, he declared, before sufficient pipe will be available to expand the service to other towns in southern Wisconsin. After that, he said, there will be no limitation to the use of natural gas in this area. At present the pipe line in operation serves Lake Geneva, Burlington, Delavan and south to the Illinois state line.

An expansion program, for the next two years, Knobloch stated, included an investment of about $600,000. This is to include construction of warehouses and maintenance shops for the gas company in Lake Geneva; modernization of the company stores; extension of mains to areas south of Lake Geneva; establishment of a district office for the company at Genoa City, and other improvements now being planned.

Jennings to Promote Gas Kitchens

Appointment of Norval D. Jennings of Greenwich, Conn., as assistant director of the New Freedom Gas Kitchen Bureau of the American Gas Association was announced by H. Carl Wolf, managing director of the Association. He will assist H. Vinton Potter, director of the Bureau, in the national promotion of modern all-gas kitchen units.

A graduate of Yale University, Mr. Jennings has had extensive experience in domestic sales and promotion with Gulf Oil Corporation, Socony-Vacuum, Inc., and Talon, Inc.

News of the Gas Industry

Thirty-Ninth Annual Meeting of Pennsylvania Gas Association

Representatives from public utility gas companies throughout Pennsylvania assembled at Wernersville, Pa., for the thirty-ninth annual meeting of the Pennsylvania Gas Association, which opened May 20th with the Association's president, Frank H. Trembly, Jr., of the Philadelphia Gas Works Company, presiding.

Frank H. Trembly Jr.

Louis Ruthenburg, president of Servel, Inc., discussed the future of the gas industry and its importance to the national economy in the principal address of the evening.

The sessions on the following days featured talks on production and distribution problems by Edwin L. Hall, American Gas Association; Dr. E. H. Smoker, The United Gas Improvement Co.; and H. W. Battin, Philadelphia Electric Company. Other speakers were: R. C. Holcombe, J. F. LeFevre, and R. T. Niebel, all of the Philadelphia Gas Works Company and W. LeRoy Glessner of the Harrisburg Gas Company.

The meeting was highlighted by a talk on the effect of music in industry by Professor Harold Burris-Meyer of the Stevens Institute of Technology, and a discussion of accounting problems by Daniel B. Allison, The Philadelphia Gas Works Company.

Customer and employee relations, and sales promotion were discussed by Edward M. Clark, the Bell Telephone Co. of Pennsylvania; Howard T. Jayne and C. C. Hanthorn, both of The Philadelphia Gas Works Company; Harry W. Brown, Good House Stores, Inc. and Sol W. Weill of the George D. Roper Corporation. A luncheon marked the close of the three-day conclave.

P. H. Dashiell, with United Engineers & Constructors Inc. As Consultant

United Engineers & Constructors Inc., announce that Mr. Philip Thornton Dashiell, formerly vice president of The Philadelphia Gas Works Company, is now associated with them as Consultant on Synthesis and City Gas Processes.

Mr. Dashiell was born in Annapolis, Maryland. After preparatory schooling, he entered Yale University, from which he was graduated in 1899 with the degree of Ph.B.

He entered the service of the Philadelphia Gas Works in 1899 as a Cadet Engineer and was later transferred to the Public Service Electric & Gas Company of New Jersey as Assistant Engineer of the Essex Division, in 1904, and Engineer of Manufacture in 1910. He was transferred back to the Philadelphia Gas Works in 1913 as Assistant Engineer of Works, serving in that position until 1926, when he became Engineer of Works. In 1932 he was appointed Vice President in Charge of Production, in which latter capacity he continued until his retirement on May 1, 1947.

Philip T. Dashiell

Mr. Dashiell has always been interested and active in the development of production processes in the manufactured gas inductry. He is primarily responsible for the U.G.I. Heavy Oil Process, which permits the use of heavy residuum oils in the manufacture of carburetted water gas, one the most important developments, economically, in the industry. For this work and for other important contributions he was awarded the Beal Medal by the American Gas Association, and the Walton Clark Medal by the Franklin Institute. He is also the author of numerous papers on various technical aspects of the manufactured gas industry.

CONVENTION CALENDAR

June

2-4 *Joint Production and Chemical Committee Conference,* Hotel New Yorker, N. Y.

9-11 *Canadian Gas Association,* General Brock Hotel, Niagara Falls, Ontario.

23-24 *Residential Gas Section,* New York-New Jersey Sales Conference, Essex and Sussex Hotel, Spring Lake, N. J.

July

7-8 *Michigan Gas Ass'n,* Grand Hotel, Mackinac Island, Michigan.

August

25-27 *Appalachian Gas Measurement Short Course,* West Virginia University, Morgantown.

September

15-17 *National Butane-Propane Assn.* Annual Convention, Jefferson Hotel, St. Louis.

23-25 *Pacific Coast Gas Association,* Hotel Del Coronado, San Diego, Cal.

29-30 *Independent Petroleum Assn.* Annual Meeting, Oklahoma City.

October

6-8 *American Gas Association, Annual Convention,* Cleveland, Ohio.

20-24 *National Metal Congress,* Amphitheater, Chicago.

New York-New Jersey Sales Conference

The New York-New Jersey Regional Gas Sales Conference will be held at Hotel Essex and Sussex, Spring Lake, N. J., June 23-24, James P. Hanlan is chairman of the conference. A comprehensive program on sales and sales promotion will be presented. The annual conference golf tournament will take place on the afternoon of the 24th.

L.P. Gas Association Holds Annual Convention

In connection with the regular convention and Exhibit of the LPGA held in Chicago on May 27 to 29th, an appliance manufacturers forum was held on the 28th in the West Room of the Hotel Sherman.

Mr. Lloyd C. Ginn, Chairman of the Domestic Gas Range Division of GAMA, acted as Chairman of this forum. The matters discussed were sales and sales promotion problems involving the L-P gas appliance industry and matters of interest to appliance manufacturers involving L-P gas problems of several types.

Mr. Howard D. White, Vice President of the LPGA offered suggestions during the discussions.

This forum was open to all appliance manufacturers, including non-members of LPGA.

Wisconsin Utilities Assn.

E. C. Brenner, vice president in charge of operations of the Milwaukee Gas Light Co., was elected President of the Wisconsin Utilities Association in the annual mail balloting by the membership. He succeeds B. E. Miller who becomes chairman of the Association's Advisory Committee. Mr. Brenner was vice president during the past fiscal year.

W. E. Schubert, Appleton, vice president and general manager of the Wisconsin Michigan Power Co., was elected vice president. Mr. Schubert was chairman of the Technical Division of the Electric Section in 1931-32.

Alfred Gruhl, research engineer of the Wisconsin Electric Power Co., was re-elected Treasurer.

E. C. Brenner

The new officers took office with the beginning of the fiscal year on May 1, 1947. An installation dinner was held in the Milwaukee Athletic Club on May 20.

Mr. Brenner is a Veteran Member of the Association. He has been active in its affairs since its formation and was engaged in the activities of its predecessor, the Wisconsin Gas and Electric Association. He was chairman of the Technical Division of the Gas Section in 1937-38.

He was appointed the first holder of a research fellowship in gas engineering established by the Wisconsin Gas and Electric Association. During the ensuing year he was engaged in gas purification research under the direction of Professor O. L. Kowalke, and pursued further graduate study leading to a degree in chemical engineering in 1920.

In June of 1920 he entered the full time employ of the Milwaukee Gas Light Co. in its production department, having previously worked in their plant during vacation periods.

Philadelphia Gas Works Co. Announces Promotions

Hudson W. Reed, President of The Philadelphia Gas Works Company announced yesterday that certain important changes in the Company's organization were taking effect as of May 1st. Mr. Philip T. Dashiell has resigned as Vice President in charge of production and has been retired by the Company. He is succeeded by John V. Postles. Mr. Postles was Engineer of Works and has been Mr. Dashiell's assistant since 1938.

John V. Postles

Mr. Postles was born in Smyrna, Delaware in October 1890, and was graduated from Delaware College in 1911 with the degree of Bachelor of Science in Civil Engineering. His first position was with the U. G. I. Company on plant appraisal work at Omaha and Kansas City. Later, he became an engineer with U. G. I. in Philadelphia on experimental work for the purpose of developing a more efficient gas making process. In January, 1914, he began his service with The Philadelphia Gas Works Company in the Distribution Department, and later became a special engineer on utilization of industrial gas appliances. Between 1918 and 1925 he was an engineer on gas production at both the Point Breeze and Port Richmond plants. In 1925, he became Assistant to the Engineer of Works who was then W. H. Gartley, later Assistant to the Vice President in Charge of Production, and subsequently Engineer of Works.

Other changes announced by Mr. Reed are that H. D. Lehman, formerly Manager of the Customers Service Department was appointed Engineer of Works to succeed Mr. Postles, and Mr. H. L. Robbins heretofore an assistant to Mr. Lehman became Manager of the Customers Service Department. A new division within the Production Department has been created. Mr. T. F. Clark who, prior to May 1st was Superintendent of the Point Breeze works, will head the new Division with the title of Engineer of Construction, and his assistant will be S. C. Symnoski. At the Point Breeze plant, Mr. Harry E. Hodgson, theretofore assistant to Mr. Clark is made Superintendent of the plant.

Indiana Gas Association

The 37th annual convention of the Indiana Gas Association was held May 15th and 16th at the French Lick Springs Hotel, French Lick, Indiana. Attended by approximately 300 delegates, the theme of the convention was "The BLUE FLAME Is On The March."

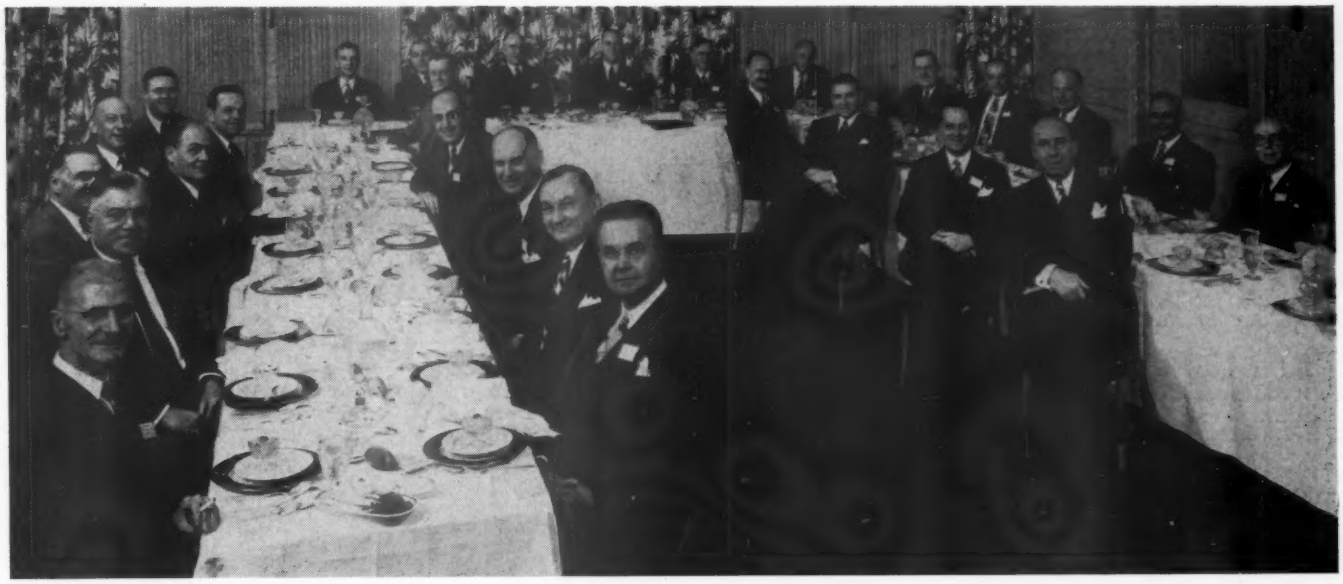
L. B. Schiesz Dean T. Burns

Outstanding speakers addressed the delegates at the two-day meeting. Dr. M. O. Ross, president of Butler University, stated that the United States must consciously plan to maintain high level production and employment if the free enterprise system continues to work successfully.

Grove Patterson, editor of the Toledo Blade, who has toured Russia three times and has traveled extensively in Europe and Asia, discussed Russia's foreign policy.

R. H. Hargrove, president of the American Gas Association, predicted years of great expansion for the gas industry. Mr. Hargrove also discussed the role the American Gas Association has played in the industry's progress through its program of research, promotion and advertising.

At the closing session of the convention, new officers for the Association were elected. Dean T. Burns, assistant general manager of Citizens Gas & Coke Utility, was elected president and L. B. Schiesz, president of Indiana Gas & Water Co., Inc., was elected vice-president. Clarence W. Goris, Northern Indiana Public Service Company, was re-elected secretary-treasurer along with the following directors: R. S. Brunner, Terre Haute Gas Corporation; C. M. Cullison, Central Indiana Gas Company; F. W. Dopke, Indiana Gas & Water Co., Inc.; and E. E. Linburg, Richmond Gas Corporation.



Dinner Meeting of the Managing and Advisory Committees and guests, Natural Gas Department, A.G.A. held at Stevens Hotel, Chicago, April 30th, 1947.

Left to right around the outside: George A. McDonald, J. D. Creveling, Hiram M. Dow, H. R. Bennett, E. P. Noppel, E. L. Rawlins, William Ferguson, John W. West, Jr., H. Carl Wolf, J. French Robinson, Robert W. Hendee, H. D. Hancock, George H. Smith, Frank H. Lerch, Jr., Arthur F. Bridge, H. J. Carson, Elmer F. Schmidt, Professor C. M. Young.

Left to right around the inside: C. H. Zachry, Edward Buddrus, A. H. Weyland, E. G. Dahlgren, F. W. Peters, F. A. Hough, E. S. Pettyjohn, Irving K. Peck, Major T. J. Streckler.

Accounting Session A.G.A. at Natural Gas Meeting

The Accounting Committee of the Natural Gas Department of the A.G.A. held an open round-table conference in Chicago on April 30th. It was the best attended of any natural gas accounting meeting since the organization of the Committee of which F. W. Peters of Tulsa is Chairman.

A short paper was presented to the group outlining the general principles of depletion accounting for natural gas companies. The discussions brought out different types of utility plant subject to depletion, methods of depleting these assets under the Federal Power Commission classification, and under the various State classifications of accounts. It was the consensus of the group that one of the most important problems in depletion accounting is the establishment of a correct gas reserve, either for the lease or a pool of leases.

Several members present from companies actively engaged in drilling programs presented problems on the subject of geological, geophysical, and exploratory drilling costs.

Accounting for and tax treatment of gas in storage in reservoirs brought forth an interesting discussion, particularly with reference to the depreciation and amortization of lease or land cost for the reservoir and the equipment installed for the input and output of the stored gas.

A number of those present requested information on classification of accounts for propane, butane and other by-products of natural gas. They were advised that a Committee of the American Gas Association, headed by Mr. W. H. Ainsworth of United Gas Pipe Line Company, prepared a suggested revision of the uniform system of accounts for natural gas companies to revise the present accounting for natural gas by-products operations of natural gas companies, and that a copy of this Committee's report could undoubtedly be secured by writing to Mr. Ainsworth.

Among other matters discussed at the meeting were training programs for natural gas company accounting personnel, job evaluation programs, merits of centralized vs decentralized billing of customers, and the direct connection of customers due to the present shortage of meters.

Executive Group Appointed

An Executive Committee of seven members with full power to act for the Executive Board of the American Gas Association between regular meetings was appointed at the April 28 meeting of the Board held in Milwaukee, Wisconsin. This action follows adoption of a recent amendment to the A.G.A. Constitution and By-Laws by the Association's membership.

The executive group, which is expected to expedite the conduct of Association affairs, consists of the president, R. H. Hargrove, vice-president, United Gas Pipe Line Co., Shreveport; the vice-presidents, Hudson W. Reed, president, The Philadelphia Gas Works Co., Philadelphia; and Robert W. Hendee, president, Colorado Interstate Gas Co., Colorado Springs; the immediate past president, Everett J. Boothby, vice-president and general manager, Washington Gas Light Co., Washington, D. C.; Lyle C. Harvey, president, Bryant Heater Co., Cleveland, representing the manufacturers; George F. Mitchell, president, The Peoples Gas Light and Coke Co., Chicago; and E. H. Eacker, vice-president, Boston Consolidated Gas Company.

Cushman Joins Monthly

Appointment of Jac A. Cushman of New York as managing editor of the *American Gas Association Monthly* has been announced by H. Carl Wolf, managing director of the Association.

Mr. Cushman was formerly assistant financial editor of The Hartford Courant, nationally-known morning newspaper in Hartford, Conn., following prewar experience as city reporter on the same paper.

James M. Beall continues as editor.

1948 A.G.A. Convention

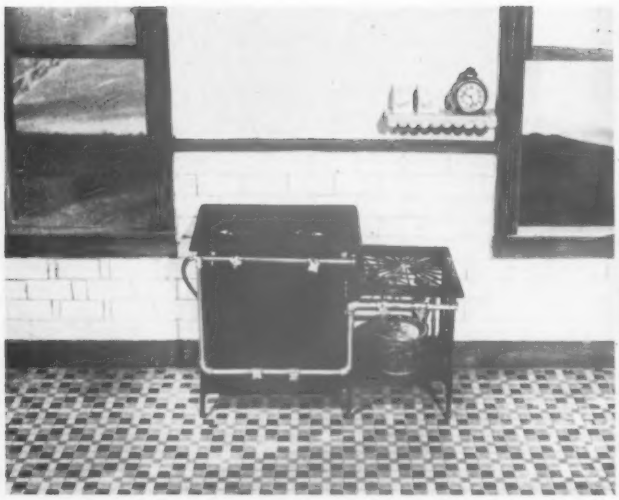
The 1948 Convention of the American Gas Association will be held in Atlantic City, N. J., the week of October 4.

At a meeting in Milwaukee, April 28, the Executive Board approved the recommendation of the Time and Place Committee of which Alfred Hirsh, Vice-President of The Laclede Gas Light Company is Chairman. The action of the Executive Board will be referred to the 1947 Convention for the ratification of the membership.

Ordinarily, the report of the Committee on Time and Place for the 1948 Convention would have been made and acted upon at the 1947 Convention in Cleveland but present conditions required earlier action to assure suitable accommodations.

1948 Natural Gas Meeting

The Natural Gas Department of the American Gas Association has selected Houston, Texas, on May 4 and 5, for the place and time of its Annual Spring Meeting in 1948. Headquarters will be at the Rice Hotel in Houston.



Ring out the Old,—Bring on the New. These two spot views taken from the Color-Sound Motion Picture show on the left the 1900 model range and primitive setting compared with the modern New Freedom Gas Kitchen on the right with its convenient, clean setting and pleasant surroundings.

New Gas Color-Sound Motion Picture

An elaborate new 16 mm. sound-color motion picture entitled "Winning Seals of Approval," has just been completed by the American Gas Association and will be released shortly for showing throughout the country. In a dramatic and highly effective fashion, the film tells the story of the rigid performance tests the modern gas range undergoes before meeting the industry's nationally-recognized standards of approval.

A total of more than 75 scenes and a cast of 16 people were utilized in the picture which is based largely on operations at the A. G. A. Testing Laboratories. Much of the story centers around some of the 600 tests a gas range must pass before winning the A. G. A. Seal of Approval. Scenes include operations in a factory laboratory and field inspections on the production line of one of the largest manufacturers plants.

The last one-third of the film deals with the additional requirements which go into the making of a range built to "CP" standards. Thus the total effect of this new gas medium is to reveal the many fine qualities of the automatic gas range by accenting the authoritative Laboratory work which is behind its superlative operating performance. At least ten different "CP" model gas ranges and two complete New Freedom Gas Kitchens are employed in the picture.

Widespread distribution of the film is planned. In an effort to reach one million home economics students in the '47-'48 school year, 100 prints will be booked in high school and college home economics classes by Modern Talking Pictures Service. A special Teachers' Manual is being prepared for use with the film in these showings. This manual will suggest pre-showing discussion and study and post-showing discussion and quiz.

Fifty prints will be held by the A. G. A. Promotion Bureau, which supervised the film, for distribution to member companies contributing to the Research and Promotional Fund. These will be for showings before adult groups and may be used in connection with home demonstration classes as well. A. G. A. member companies and range manufacturers may purchase prints at actual cost of approximately $115 each.

Preview showings of "Winning Seals of Approval" will be made in mid-June and July. School showings will get underway in September while prints will be available to gas companies as soon as available, probably in August.

Inquiries should be addressed to Promotion Bureau, American Gas Association, 420 Lexington Ave., New York 17, N. Y.

Achievement Awards Increased

A new program of awards was adopted by the American Gas Association Executive Board on April 28 following recommendations of the Committee on Association Awards headed by Walter C. Beckjord, chairman. Individual achievement will be recognized annually in six major awards, one more than last year, and the terms of some of the long-established awards have been liberalized to provide added incentives.

The six awards set up under the new program are as follows:

Munroe Award Renamed. The industry's most coveted honor, the Charles A. Munroe Award, has been re-named the American Gas Association Distinguished Service Award. It is made annually to the individual who has made the most outstanding contribution toward the advancement of the gas industry.

In the past this award has been bestowed for contributions in refrigeration, labor-saving, accounting, rate making, dealer cooperation, sales expansion, research system changeovers, public relations, scientific developments in gas measurement, promotion of national advertising, and many other fields of endeavor.

Meritorious Service Award for heroic action continues as in the past to be the industry's highest life-saving recognition. It consists of a gold medal, button and certificate and is presented to the individual who has performed the most meritorious act in the gas industry each year beginning July 1 and ending June 30. Applications must be filed on or before August 1 on a form provided by the Association.

Beal Medal. This remains the highest technical recognition in the industry. Originated by the late W. R. Beal and carried on by the Beal family it is presented to the author of the best technical paper presented at a meeting of the Association during the year commencing July 1 and ending June 30.

McCarter Medals will continue as before to be awarded to individuals throughout the year for outstanding acts of life-saving by application of the prone pressure method of resuscitation. They are presented upon recommendation of the Accident Prevention Committee and approval of the Executive Board.

McCall Award Revised. By recent agreement the McCall's Home Service Award is now offered under completely revised and liberalized terms as the A.G.A. Home Service Achievement Award, sponsored by McCall's Magazine. The new regulations provide equal opportunity for individual recognition and company awards, regardless of size. Cash prizes totalling $1,000 will be made annually in five equal awards which will be presented at the annual convention.

New Heating Award. A completely new annual contest known as the A.G.A. Gas Heating Progress Award has been set up under the sponsorship of the Coraire Heater Corporation. The latter firm has donated $5,000 for a series of five annual awards of $1,000 each to be awarded to the individuals making the greatest contribution toward the advancement of gas heating. First prize is $500; second, $250; third, $150; fourth, $50; and fifth, $50.

Dean H. Mitchell Elected Director of U.S. Chamber of Commerce

The Chamber of Commerce of the United States has announced the election of Mr. Dean H. Mitchell, President of the Northern Indiana Public Service Company, Hammond, Indiana, as a Director of the national organization. Mr. Mitchell represents District Five which comprises the States of Michigan, Indiana, Ohio and Kentucky.

Dean H. Mitchell

Mr. Mitchell is at present a Director and formerly served two terms as President of the Indiana State Chamber of Commerce. He is well known in the utilities field, having served on various committees of the American Gas Association and is a Director and Past President of the Indiana Electric Association and also the Indiana Gas Association.

Mr. Mitchell has been President of the Northern Indiana Public Service Company since 1938.

Vancouver Appliance Sales

Sales of gas appliances in the Greater Vancouver area, B. C. during March totalled $39,776, according to figures of the B. C. Electric Railway Co. Ltd.

Major gas appliances sold included 208 ranges, 49 automatic storage water heaters, nine tank water heaters, eight refrigerators and five gas fires.

Jean Clark Thompson on Publicity Bureau A.G.A.

H. Carl Wolf, Managing Director, announces the appointment of Jean Clarke Thompson to the Publicity Bureau of the American Gas Association to direct all domestic gas equipment publicity and services covering the use of gas equipment in homes for national magazines, women's pages of newspapers and women's radio programs.

Miss Thompson, who was educated at McGill University and the University of Toronto, comes to the American Gas Association from Palmer Bevis, Inc., Public Relation's Counsels, where she was an account executive on trade association and industrial accounts. During the war years she was assistant to the Director of Public Relations of The Dayton Rubber Manufacturing Company, handling publicity for their three plants and, previously, has edited trade and women's magazines and directed publicity and promotion in both the women's and industrial fields in Canada and the United States.

Jean Clarke Thompson
Underwood & Underwood

Bryant Heater Contest on Installation Photos

Cash prizes are being offered for best installation photos of any Bryant Heater product, it has just been announced by the Bryant Heater Company. Any person connected with the specification, sale or installation of Bryant Heater products is eligible, and July 15th is the final deadline for entries.

$100.00 cash is the first prize, with second and third bringing $50.00 and $25.00 respectively, and twenty-four prizes of $2.00 each being offered. In addition to these cash prizes, Bryant announces it will send a 3-piece, 4-color window display set valued at $2.50 to every person submitting a Bryant product installation photograph.

Entries will be judged not on the quality of the photographs, but on the merits and interest value of the particular installations depicted. Details available from Bryant Heater Company, Cleveland, Ohio.

Frieda Barth Named Home Service Head at Detroit

In recognition of her sixteen years in Home Service work with Michigan Consolidated Gas Company, Frieda H. Barth has been appointed Director of the Home Service Department in Detroit.

Frieda H. Barth

Miss Barth came to the company as a graduate of Iowa State College, Ames, Ia. Since her graduation she has been very active in her field, first as a home economics teacher and then in Home Service work.

Her name has often been listed as an officer or committee chairman of the Detroit Home Economics Association and the Home Economics in Business.

"JOURNAL" GAS FLOW COMPUTERS

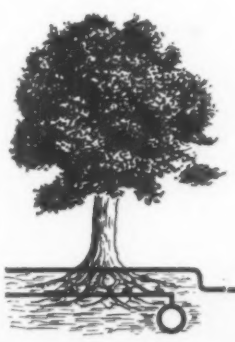
High Pressure
RANGE:
Cu. Ft. of Gas Per Hour—100-10,000 M
Diameter of Pipe—Inches ¾-30
Difference in Absolute Pressure—Lbs. per sq. in., 1-500
Sum of Absolute Pressures—Lbs. per sq. in., 2000-20
Specific Gravity—1.5-.35
Length of Pipe—Feet 100-5000
Length of Pipe—Miles 1-250

Low Pressure
RANGE:
Cu. Ft. of Gas Per Hour—10 to 500 M
Pipe Diameter—¾" to 48" (including standard and actual weight up to 4")
Pressure Loss—Inches .01-10
Length of Pipe—Feet 30-30,000
Specific Gravity—1.5-.35
Constants—1400-1000

Made of durable celluloid, encased in a convenient leatherette cover with complete instructions. Actual size 6¼ x 7½

$4.00 Each Postpaid

American Gas Journal
53 Park Place, New York 17



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NOW is the Season to arrange for inspection of distribution lines to detect leakages.

Our fully trained personnel is at your service. We can submit a complete report covering locations, source of leaks, severity of the condition and vegetation affected. We can cover any section of your lines or the complete system working on a per diem basis.

Write us regarding rates and schedules.

VEGETATION SURVEY ASSOCIATES
53 Park Place, N. Y. 7, N. Y.

Roberts & Mander Appoints Doran District Manager

Roberts & Mander Corporation, Hatboro, Pa., has announced the appointment of James F. Doran, as District Manager for Metropolitan New York, New York State, and New Jersey.

James F. Doran

Mr. Doran has been the Quality Sales Representative for the state of New Jersey for over fifteen years, and will assume his new duties with a broad understanding of the market. His main objective will be the direction of his company's expanding promotional plans in his district.

Mr. Doran will make his headquarters at the Quality district office and showroom, 1 Park Avenue, New York. He succeeds John H. Emery, who has recently been appointed Vice President and Sales Manager.

New Research Manager Named By Bryant Heater

Indicative of the growing trend of consumer goods manufacturers toward still more intensive study of their markets is the appointment of Robert T. Killian as manager of market development and research by the Bryant Heater Company of Cleveland.

Killian comes to Bryant Heater from the Westinghouse Electric Corporation where he was manager of the product and industry section of the market development department. Previous to that connection, this young market analyst was manager of the sales analysis section of the U. S. Steel Corporation.

In his new capacity, Killian will study the expanding demand for gas heating so that production of Bryant Heater plants at Cleveland, Ohio, and Tyler, Texas, may be keyed to meet market requirements. His research will include special studies on the market for steel gravity furnaces, floor furnaces, water heaters, wall heaters and space heaters, all of which are new products in the greatly enlarged line of Bryant gas heating equipment.

Robt. H. Taylor Elected V.P. Florence Stove Co.

Robert H. Taylor was elected Vice President in Charge of Sales of Florence Stove Company at a recent meeting of the Board of Directors. Mr. Taylor succeeds Harvey E. Golden who died in January.

Mr. Taylor, formerly General Sales Manager, has been associated with the Florence sales organization for fifteen years, a good portion of this time as manager of the New York Sales Division.

Mr. Taylor makes his headquarters at the Florence home office in Gardner, Mass.

Lucky Tailor Shop Gets Free Lattner Boiler

To commemorate the completion of their new enlarged straight line production boiler plant, the P. M. Lattner Co. of Cedar Rapids, Ia., presented "Classmate Cleaners," Columbus, Ohio, with the first unit off the assembly line, the Frank T. Carroll Co. of Columbus, cooperating in the gift.

The Lattner Company have been manufacturing pressing machine boilers since 1917. Having a pent-up demand for these during war years, the award was made of the first unit based on the order of longest standing.

Production facilities will now enable the Lattner Company to catch up on accumulated orders. During the war they were turning out boilers to operate tire rebuilding equipment used at foreign military and naval bases.

"Elno" Trade Mark Registered RUST PREVENTER
For Steel Hot Water Storage Tanks
Rust NO LONGER A Must!

"ELNO" eliminates the need for expensive non-ferrous or specially-processed tanks even where water is so highly-corrosive that such tanks have always been considered essential. It is not like some chemical "rust inhibitors" which merely bleach discolored water and do little or nothing to prevent rust or protect the tank. "ELNO" really routs rust, requires no attention, and causes no further expense after installation.

Get set now to tap an important new source of profit by offering your customers maximum security against rust and corrosion in the equipment you sell and service. The field is broad because "ELNO" is available in types and sizes for all makes of heaters and boilers. Write for technical, catalog, price and promotional information today.

PATENT APPLIED FOR
The Cleveland Heater Co.
2310 Superior Ave. Cleveland 14, Ohio

CLEAN, RUST-FREE HOT WATER AT LOWEST EQUIPMENT COST

GPM IRON HYDROXIDE
The mark of unerring dependability in purification
GAS PURIFYING MATERIALS CO., INC.
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GAS PLANT EQUIPMENT
UGI REFINERY GAS REFORMING PROCESS
UGI NATURAL GAS REFORMING PROCESS
UGI HEAVY OIL PROCESS
GAS DISTRIBUTION
PIPE LINE CONSTRUCTION
THE U.G.I. CONTRACTING COMPANY
A DIVISION OF
UNITED ENGINEERS & CONSTRUCTORS INC
NEW YORK PHILADELPHIA CHICAGO
MAXIMUM RETURN TO CUSTOMER PER DOLLAR EXPENDED

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Bowser Inc. Incinerator Div.

Bowser Inc., Incinerator Division, 110 No. Franklin Street, Chicago 6, has appointed McNaulin Inc. of Milwaukee distributors for Wisconsin upper Michigan and Minnesota. Cities Gas Appliance Co. of Detroit is distributor for Lower Michigan.

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Schock Joins Gas-Oil Products

George W. Schock will become affiliated with Gas-Oil Products, Inc. on May 15th as Sales Manager, it was announced by Mr. John H. Ware, 3rd, Vice President. Mr. Schock was formerly Domestic Sales Manager for the Philadelphia Gas Works.

He will be located at the company's main offices in Oxford, Pennsylvania and will direct the sales of the company through its twenty-five branches operating in Pennsylvania, New Jersey, Maryland and Delaware.

Reimer Elected Vice President Dresser Industries, Inc.

Mr. Rudolph E. Reimer, Secretary and Treasurer of Dresser Industries, Inc., Cleveland, Ohio, was also elected a Vice President of the company at a meeting of the Board of Directors in New York, April 22.

As a top Dresser executive, Reimer is an officer and director in many of the Dresser units. A vice president and director of the Bryant Heater Company, Cleveland, and of Bovaird & Seyfang Manufacturing Company, Bradford, he is also secretary and treasurer and director of Dresser Manufacturing Company, Ltd., Toronto, and of Pacific Pumps, Inc., Huntington Park, California; and a director of Clark Bros. Co., Inc., Olean; International Derrick & Equipment Company, Columbus; Stacey Bros. Gas Construction Company, Cincinnati; Roots-Connersville Blower Corporation, Connersville, Ind., and three of Dresser's California member companies, Payne Furnace Company, Beverly Hills; Day & Night Manufacturing Company, Monrovia; and Kobe, Inc., Huntington Park.

Payne Furnace Operates 2-Way Contact with Service Trucks

Payne Furnace Company, Beverly Hills, California, has announced the inauguration of a new "ship-to-shore" radio telephone service which will enable the Company's fleet of service trucks to maintain telephone contact with the plant's Service Department at all times. Company officials stated that this equipment will facilitate the handling of furnace service calls.

This special two-way communication system permits Payneheat's main office to relay service calls to the truck operator while enroute or when on another job. The truck operator can originate calls by pushing a "talk" button which puts him in touch with a telephone company mobile service operator who connects him with the number called.

Payne Furnace Company's first radio phone equipped service truck is now in operation. The Company's entire fleet of service trucks will be similarly equipped when facilities are available.

Graduate Study Plan Inaugurated for Laboratories Staff

A cooperative plan for graduate study between the American Gas Association Testing Laboratories and Case School of Applied Science has been inaugurated by the two institutions and announced by R. M. Conner, Director of the Laboratories, and Dean Elmer Hutchisson of the school. Approved by the Case Faculty March 6, the new arrangement will make it possible for employees of the Laboratories to obtain advanced training in science and engineering while continuing their regular research activities on a full-time basis and help them fulfill the formal requirements for a Master's or Doctor's degree in science or engineering.

Under the plan Laboratories employees may obtain advanced degrees from Case School of Applied Science by fulfilling lecture and laboratory courses given by it and successfully completing research at the Laboratories which will provide thesis credit. They will work under a faculty adviser after outlining their proposed program and securing its approval by the head of the department at Case School in which the work towards an advanced degree will be taken, and by the Dean as well as by the Chief Research Engineer of the Laboratories. Research at the Laboratories will be undertaken as part of the employee's regular duties under supervision of the Laboratories staff and in addition will be supervised by a Case faculty member in the capacity of consulting supervisor.

The plan is expected to tie in directly with a number of research projects sponsored by various research committees of the American Gas Association. Qualified Laboratories employees thus will be able to obtain partial credit towards an advanced degree for work conducted as part of their regular duties. Upon completion of research an approved Laboratories report may constitute the student's thesis although the faculty supervisor may outline any additional work should he believe any to be necessary for thesis credit.

Manual of Cast Iron Pipe and Fittings

Cast Iron Pipe Research Association has just published an 88 page manual of mechanical joint cast iron pipe and fittings for the gas industry.

Cloth bound and profusely illustrated, a free copy is available to gas distribution engineers and superintendents as well as executives.

This book is standard filing size and covers the following:

Weights of pipe, accessories and dimensions of fittings for Standardized Mechanical Joint Cast Iron Pipe, photos of progressive assembly steps and installations from 2 inch to 30 inch, and includes 26 pages of engineering tables, formulae and useful hints.

Address Thomas F. Wolf, Engineer, Cast Iron Pipe Research Association, Peoples Gas Building, Chicago 3, Ill., for your copy, giving your Company position.

Hargrove Elected President of Texas Eastern

George R. Brown, Chairman of the Board of Texas Eastern Transmission Corporation, announced in Houston May 27th that at a meeting of the stockholders held in Wilmington, Delaware, the following directors were elected to serve during the ensuing year:

August Belmont and E. Holley Poe of New York City, Charles I. Francis, Herman Brown and George R. Brown of Houston, E. DeGolyer of Dallas, and R. H. Hargrove of Shreveport, Louisiana.

At a meeting of the Board of Directors, Mr. Hargrove was elected President and General Manager and E. R. Cunningham, also of Shreveport, Louisiana, was elected to serve as Vice-President and Operating Manager. Mr. Francis was also elected to serve as Vice-President. O. S. Carpenter, formerly of Austin, Texas, was elected comptroller, and Herbert J. Frensley of Houston was re-elected Secretary-Treasurer.

In announcing election of the officers, Mr. Brown stated that he spoke for all the directors in expressing his regret that Mr. Poe felt it inadvisable to continue to serve as President of the company, in which capacity he has served since its incorporation. Mr. Poe stated he felt that the demands which would be made upon his time would make it impossible for him to resume the responsibilities and do justice to his consulting business.

Gas Ranges Vs. Electric

The gas industry gained 7,100,000 cooking customers from 1935 to 1947 despite war-time restrictions which prevailed for five of the eleven years of this period. This is a 45 per cent increase over the 15,752,000 homes which cooked with gas in 1935 and brings to 22,900,000 the number of homes in the United States using gas ranges.

During the same eleven-year period, 2,800,000 additional families purchased electric ranges and brought the total number of electric cooking customers to 4,000,000.

Better than 90 per cent of all homes on piped gas lines use gas for cooking, and 62 per cent of all homes in the United States cook with either piped or with bottled gas.

Rural L-P gas cooking customers total 3,500,000 and have increased more than 600 per cent since 1935. The number of electric range installations in rural territories totals 1,785,000.

A.G.A. Executive Group Appointed

An Executive Committee of seven members with full power to act for the Executive Board of the American Gas Association between regular meetings has been appointed.

The executive group, which is expected to expedite the conduct of Association affairs, consists of the president, R. H. Hargrove, vice-president, United Gas Pipe Line Co., Shreveport; the vice-presidents, Hudson W. Reed, president, The Philadelphia Gas Works Co., Philadelphia; and Robert W. Hendee, president, Colorado Interstate Gas Co., Colorado Springs; Lyle C. Harvey, president, Bryant Heater Co., Cleveland, representing the manufacturers; George F. Mitchell, president, The Peoples Gas Light and Coke Co., Chicago; and E. H. Eacker, vice-president, Boston Consolidated Gas Company.

Your industrial gas customers should know about

the NEW **NORWALK MODEL N-50 INSPIRATOR**

This new type represents the first notable design improvement in inspirators. It can be cleaned *in less than a minute!*

Only the Norwalk N-50 makes possible these extra *plus*-advantages for your inspirator-type system:

- **Lets Your Burners Operate with Constant, Even, Full Combustion**
- **Eliminates Soot Deposit**
- **Eliminates Burner Overheating by "Lazy" or "Soft" Flame Resultant from Rich Mixture Due to Insufficient Air**

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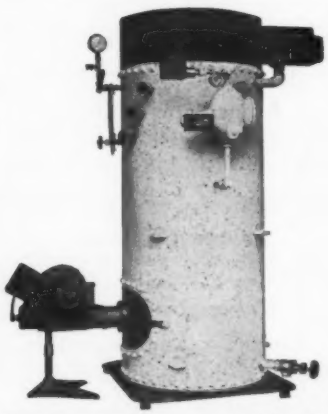
33 Railroad Ave., South Norwalk, Conn.

LATTNER GAS — OIL BOILER 3 HP to 35 HP.



Burns natural gas or regular furnace oils with equal efficiency using same burner.

P. M. Lattner Mfg. Company Cedar Rapids, Iowa